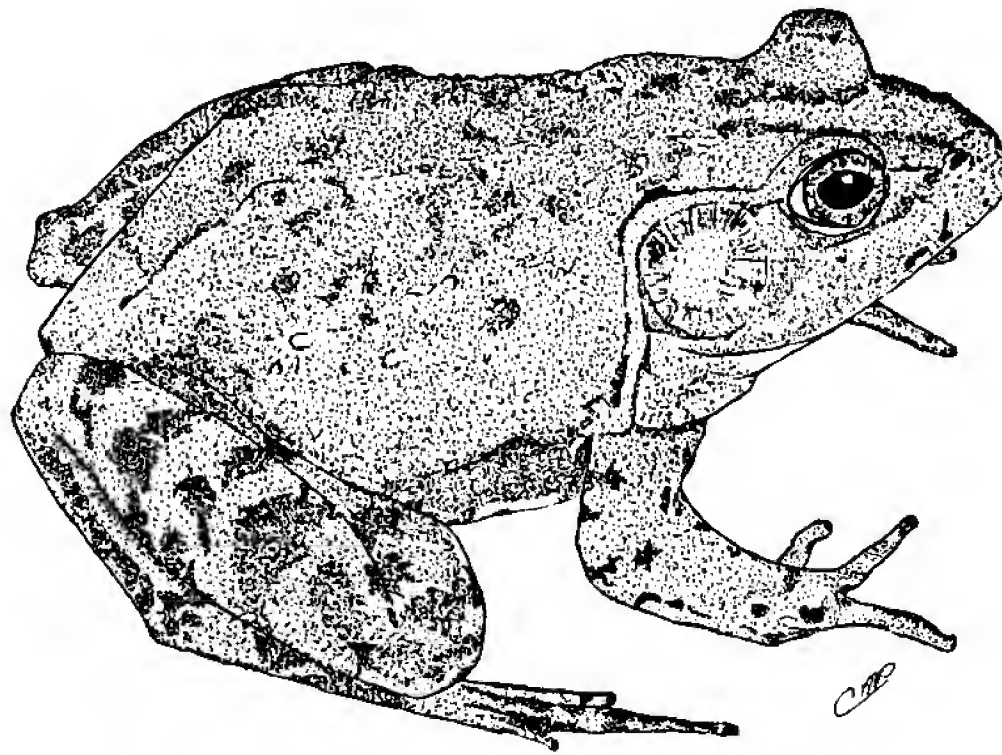


CATESBEIANA



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JOURNAL INFORMATION

Catesbeiana is published twice a year by the Virginia Herpetological Society. Membership is open to all individuals interested in the study of amphibians and reptiles and includes a subscription to *Catesbeiana*, two newsletters, and admission to all meetings. Annual dues for regular membership is \$15.00. Payments received after September 1 of any given year will apply to membership for the following calendar year.

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The principal function of *Catesbeiana* is to publish observations and original research about Virginia herpetology. Rarely will articles be reprinted in *Catesbeiana* after they have been published elsewhere. All correspondence relative to the suitability of manuscripts or other editorial matters should be directed to: Dr. Paul Sattler, Editor, *Catesbeiana*, Biology/Chemistry Department, Liberty University, MSC Box 710155, 1971 University Blvd., Lynchburg, VA 24515, (email: psattler@liberty.edu).

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Manuscripts for consideration of publication in *Catesbeiana* should be submitted to the Editor electronically. Consult the style of articles in this issue for additional information, including the appropriate format for literature citations. The metric system should be used for reporting all types of measurement data. Email attachments in Word format is desired for all papers. Submissions concerning the herpetofauna of selected areas, such as a park, city or county, should be prepared in article rather than field note format. Articles will be refereed by the editor and one or more qualified reviewers. All changes must be approved by the author before publication; therefore, manuscripts must be received by the editor before February 1 and July 1 to be considered for publication in the spring and fall issues, respectively, of *Catesbeiana*. Reprints of articles are not available, but authors may reprint their own articles to meet professional needs.

(Editorial policy continued on inside back cover)

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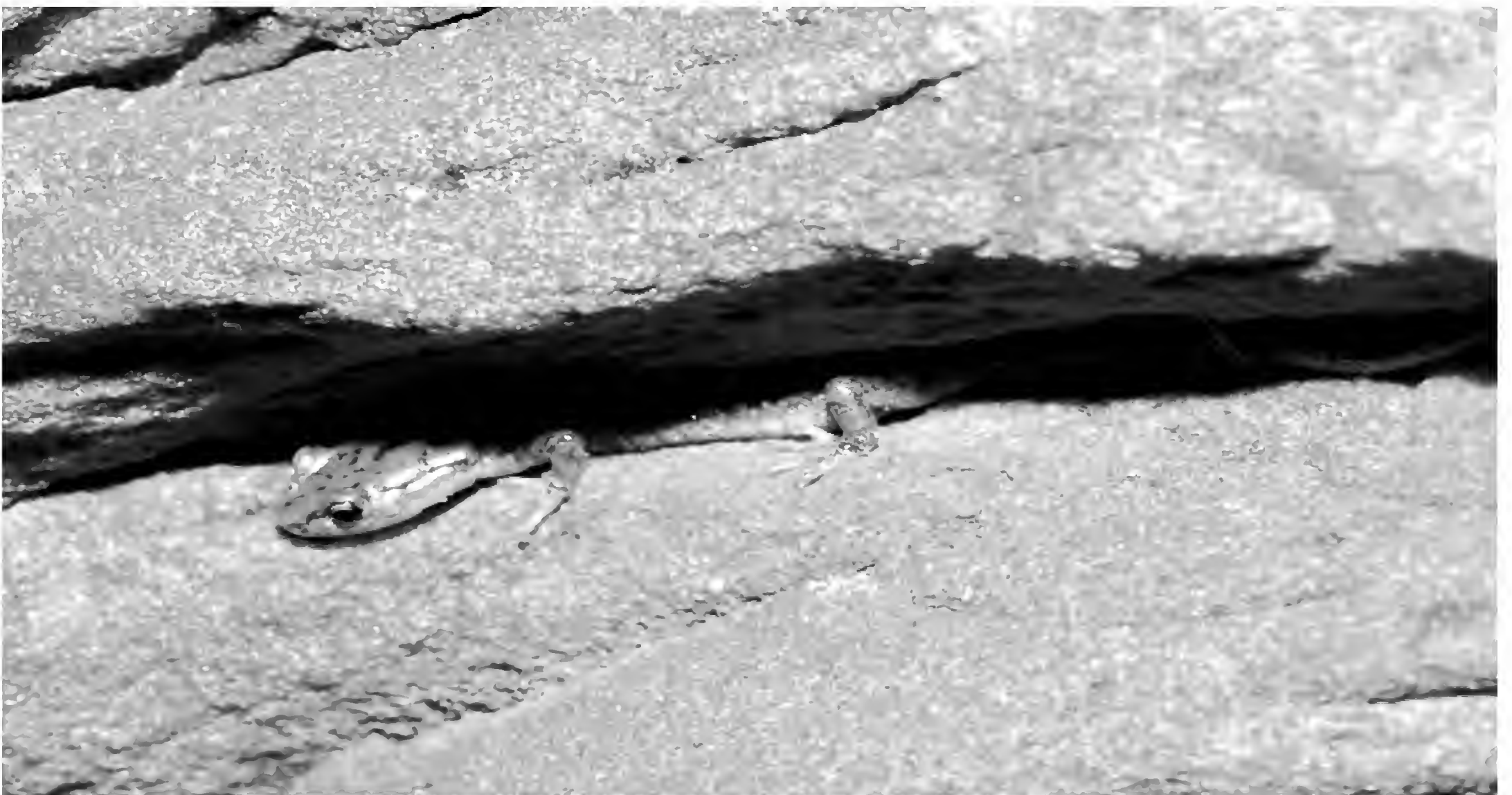
Next Survey

Stewart's Creek Wildlife Management Area 27-28 June 2016

The Quarry Gardens, Schuyler VA 4 June 2016

Natural Bridge, VHS Spring Meeting and Survey 10-12 June 2016

Registration is Required or Requested for all surveys, see website for details.



**Records of Amphibians and Reptiles from Breaks Interstate Park,
Dickenson County, Virginia**



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Introduction

Breaks Interstate Park is one of only two State parks with property in two adjacent states. It consists of 1860 hectares (4600 acres) in Pike County, Kentucky and Dickenson and Buchanan counties in Virginia. Breaks Interstate Park is termed the “Grand Canyon of the South” because it includes the deepest gorge east of the Mississippi River, cut by the Russell Fork River. It was discovered by a party led by Daniel Boone in 1767 and is the only pass through the 200 km (125 mi) long Pine Mountain. The section of Russell Fork that passes through the Breaks is one of the most treacherous whitewater rafting rivers in the United States, underscoring the rugged terrain of the area.

The Park was formed in 1954, when both state legislatures approved the Breaks Interstate Park Compact and each donated \$50,000 in start-up funds. From 1955-57, the Clinchfield Coal Company donated 457 ha (1129 acres), which comprises the majority of the current park. In 1955, Breaks Interstate Park was formally dedicated. Between 1957-58, infrastructure was added, including the entrance gate, guardrails, trails, and ground was broken for the Rhododendron Lodge. The dam on Laurel Branch, forming the 4.85 ha (12 acre) Laurel Lake, was completed in 1963.

Today, Breaks Interstate Park is financially self-sufficient and operated by the Breaks Interstate Park Commission. It consists of 1860 ha (4600 acres) with over 40 km (25 mi) of trails that meander through valleys and over ridges and along limestone cliffs that provide habitat for Green, Long-tailed, and Slimy Salamanders. It is located in the Appalachian Plateau Physiographic Province and Russell Fork flows northwest into the Big Sandy River, then the Ohio and Mississippi Rivers

The presence of Green Salamanders drew the VHS to Breaks Interstate Park initially from 10-12 July 2009 in hopes that members would be able to view this increasingly rare salamander as well as the possibility of finding Mountain Chorus Frogs. Hoffman (1981) reported *Pseudacris brachyphona* calling and found fresh egg masses in July at Grundy, Breaks Interstate Park, and Clintwood in Dickenson County. So we were hopeful this species could be found during our July survey. A return visit occurred from 13-15 June 2015. Breaks Interstate Park was also visited during 1-6 June 2008 and 5-9 May 2014 by zoology staff and volunteers of the Virginia Department of Conservation and Recreation, Division of Natural Heritage, who were primarily conducting arthropod surveys, but observations of reptiles and amphibians were recorded by Steve Roble. The results of the two VHS surveys and records obtained by the Virginia Natural Heritage Program are reported here.

Study Sites

Breaks Interstate Park was divided into 10 study sites for the VHS surveys conducted in 2009 and 2015. These sites were chosen for accessibility by groups of surveyors and for being the prime habitats to find reptiles and amphibians. A general description for each site and a central point GPS (Google Earth) reading appears below. A map of the survey sites is presented in Figure 1.

Site 1. Laurel Lake (37° 17' 21.34"N, 82° 17' 44.66"W)

This site is a large man-made lake. Visitors to the park can use this lake for fishing and can rent paddle boats to use within the lake. Cattails and Pickerel Weed are found along the margin. A mixed hardwood and Hemlock forest surrounds the lake. During the 2009 survey, baited hoop turtle traps were placed along various points of the lake.

Site 2. Beaver Pond and Beaver Pond Trail (37° 17' 47.56"N, 82° 17' 37.10"W)

Beaver Pond is a smaller man-made lake. Outlining the periphery of the lake is Beaver Pond Trail. This pond is bordered by a mixed hardwood forest.

Breaks Interstate Park Survey

Site 3. Laurel Branch Trail and Geological Trail (37° 17' 32.59"N, 82° 18' 6.52"W)

This site included two hiking trails, the Laurel Branch Trail 1.98 km (1.23 miles long) and the Geological Trail 0.56 km (0.35 miles long). The Laurel Branch Trail parallels Laurel Branch, a small stream which over the eons has cut through many layers of horizontally deposited sedimentary rock. This process has left a very interesting mix of rock formations with many small and large caves and rock crevices. The Geological Trail meanders through an area with numerous tall rock formations comprised of many horizontal layers of sedimentary rocks. Fault fractures are visible in some of the rock formations, as are fossils. Both trails pass through a mixed hardwood and Hemlock forest. In some places along the Laurel Branch there are thick Rhododendron and Mountain Laurel thickets. Dominant tree species include Hemlock, American Holly, Beech, Rhododendron, Mountain Laurel, White Oak, Tulip Poplar, Red Maple, Sour Gum, Fraser Magnolia, Basswood, Sourwood, and Sugar Maple. This vegetation gives the feeling of being in a more northerly oriented forest.

Site 4. Camp Branch Trail and Garden Hole (37° 16' 18.74"N, 82° 17' 41.70"W)

Garden Hole is a parking area and boat ramp next to the Russell Fork River. It has one of the lowest elevations in the Park at 262 m (860 feet). We tried to set turtle traps in the river at this site but were unable to place poles into the river bottom because it was solid rock. Camp Branch Trail is a 1.1 km (0.7 mile) trail that also passes through a mixed Hemlock and hardwood forest. In 2009, surveyors followed Camp Branch, the stream which parallels the trail. Camp Branch has eroded the rock layers here deeply and has formed a small gorge with many interesting rock outcrops.

Site 5. Debris pile near park entrance and maintenance area (37°17' 15.53"N, 82° 17' 35.80"W)
In addition to searching in debris piles near the park entrance, we also surveyed the maintenance area near the southeast corner of Laurel Lake.

Site 6. Road cruising all roads within park boundaries

When road cruising, we drove all main roads going through the entire park, including the parking lots at all the overlooks and at the water park adjacent to Laurel Lake.

Site 7. Cold Spring Trail (37° 17' 18.03"N, 82° 18' 2.46"W)

This site consists of Cold Spring Trail, a 0.8 km (0.5 mile) long hiking trail passing through a mixed Hemlock and hardwood forest. Near the trailhead and parking area is a boggy spring surrounded by grasses. The trail also passes through a Rhododendron thicket. Many outcrops of horizontally layered sedimentary rocks are visible on either side of the trail.

Site 8. Tower Tunnel Trail (37° 17' 8.77"N, 82° 18' 12.53"W)

This site is a very short trail leading to an overlook of the gorge created by the erosion of rock by the Russell Fork River. The surrounding forest is mixed but has a large shrub layer of blueberries.

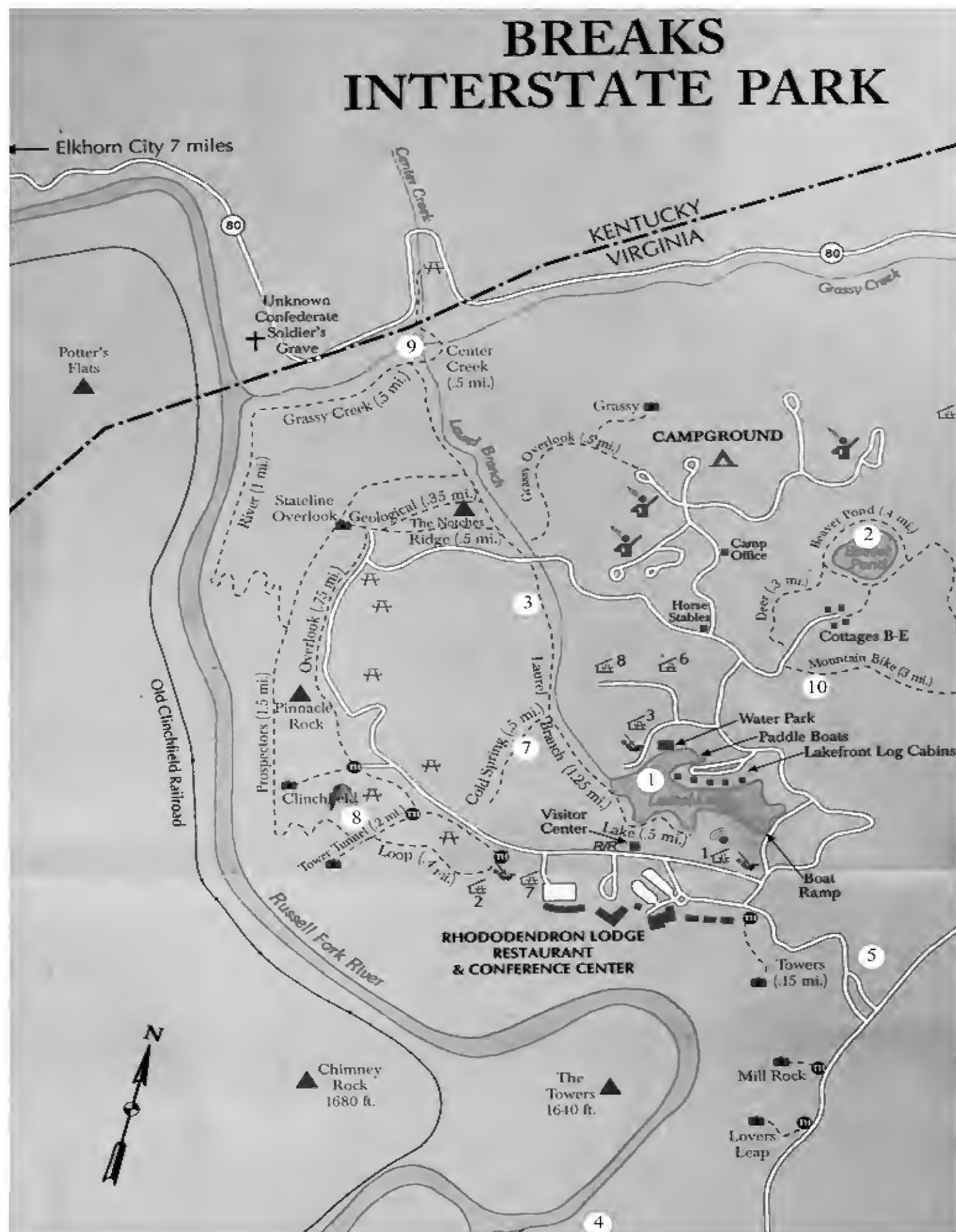
Site 9. Center Creek Trail and Grassy Creek Trail (37 °17' 56.40"N, 82° 18' 31.46"W)

At this site there are two intersecting trails. The parking area leads to the beginning of Center Creek Trail. This is a 0.8 km (0.5 mile) trail which parallels Center Creek. Erosion of rock by this creek has created a small gorge with some treacherous and slippery hiking. Center Creek Trail ends at the intersection of Center Creek with Grassy Creek. Grassy Creek Trail is 0.8 km

(0.5 miles) long and parallels Grassy Creek. Grassy Creek is a larger stream that has cut through many layers of horizontally deposited sedimentary rocks. On either side of the creek are steep walls of rock. The trail ends where Grassy Creek empties into Russell Fork River. Dominant plant species present at this site include Hemlock, Red Maple, Basswood, Tulip Poplar, Chestnut Oak, Elm, Sycamore, American Beech, and Rhododendron.

Site 10. Horse stables and Mountain Bike Trail (37° 17' 56.30"N, 82° 17' 29.87"W)
This site consists of some horse stables, other outbuildings, a small grassy pasture, and the Mountain Bike Trail. The bike trail is 4.8 km (3 miles) long and passes through a mixed Hemlock and hardwood forest.

Figure 1. Map showing survey area.



Breaks Interstate Park Survey

Materials and Methods

During both VHS surveys, only one group of surveyors was formed (see Tables 1 and 2 for amount of survey effort expended at each site). The following methods were used during both surveys: hand capture, visual observations, listening for calling male frogs and toads, flipping cover objects, and dipnetting. On 10 July 2009, three hoop turtle traps, baited with sardines, were placed at three locations in Laurel Lake. Additionally road cruising was conducted to search for reptiles and amphibians at night. Animals thought to be county records were photographed. Animals hand captured were inspected for injury, disease, and external parasites. Data sheets were completed by the survey team leader. These sheets include information on the site location, time of survey work, weather conditions, and information on the animals encountered. All survey sheets are stored in the VHS archives housed in the science building at Liberty University.

Table 1: The amount of survey effort per site for the 2009 VHS survey.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8
Number of surveyors	7	5	15	4	10	4	4	2
Hours surveyed	0.5	0.75	2.5	1.83	1.25	1.5	0.6	1.85
Person hours of survey effort	3.5	3.75	37.5	7.32	12.5	6	2.4	3.7

Table 2: The amount of survey effort per site for the 2015 VHS survey.

	Site 2	Site 3	Site 3 ^a	Site 7	Site 9	Site 10
Number of surveyors	20	21	2	2	16	4
Hours surveyed	0.78	5	2.5	2.5	1.33	1.08
Person hours of survey effort	15.6	105	5	5	21.28	4.32

3^a = night hike at site 3 on 15 June 2015

Results

The observations made by Roble and other Virginia Natural Heritage Program personnel in 2008 and 2014 documented 24 total species (7 anurans, 7 salamanders, 3 turtles, 2 lizards, and 5 snakes; Table 5). The VHS surveys conducted in 2009 and 2015 yielded a total of 27 species (7 anurans, 10 salamanders, 2 turtles, 2 lizards, and 6 snakes). Collectively, 30 species were documented in the Park. A total of 152 animals were found in 2009 and 118 animals were found in 2015 (see Tables 3 and 4 for a complete list of species found at each site). The most commonly collected amphibians in 2009 were the slimy salamanders and the most commonly collected reptile was *Sceloporus undulatus*. The most commonly collected amphibians in 2015 were *Desmognathus monticola* and the slimy salamanders, and the most commonly collected reptile was *Agkistrodon contortrix mokasen*. County records for these surveys include *Pseudacris crucifer*, *Eurycea cirrigera*, *Pseudotriton r. ruber*, *Agkistrodon contortrix mokasen*, *Pantherophis alleghaniensis*, and *Storeria o. occipitomaculata*.. A Northern Map Turtle (*Graptemys geographica*) found in the Russell Fork River on the Kentucky side of Breaks Interstate Park by Roble in 2014 is a new drainage record (Big Sandy) for this species (Roble, 2016).

Table 3. Summary of the number of amphibians and reptiles observed at each site in 2009.

<u>Sites</u>	1	2	3	4	5	6	7	8	9	10	Total
<u>Species</u>											
Amphibians											
<i>Aneides aeneus</i>			3	1							4
<i>Desmognathus fuscus</i>				6							6
<i>Desmognathus monticola</i>			7	15			1				23
<i>Eurycea cirrigera</i>				2							2
<i>Eurycea l. longicauda</i>			5	1							6
<i>Notophthalmus v. viridescens</i>	1		3			2		1			7
<i>Plethodon glutinosus/</i> <i>Plethodon kentucki</i>	1		19	7			1				28
<i>Anaxyrus a. americanus</i>					1	7		1			9
<i>Hyla chrysoscelis</i>	1					1					2
<i>Lithobates catesbeianus</i>		1				2					3
<i>Lithobates clamitans</i>	1	17	1			3					22
<i>Lithobates palustris</i>	4	1	1		3	2					11
<i>Pseudacris brachyphona</i>						1c					1
<i>Pseudacris crucifer</i>	1	12									13
Reptiles											
<i>Chelydra. serpentina</i>	3										3
<i>Terrapene carolina</i>					1						1
<i>Plestiodon fasciatus</i>					1						1
<i>Sceloporus undulatus</i>					4						4
<i>Agkistrodon contortrix mokasen</i>			1								1
<i>Diadophis punctatus edwardsi</i>			1		1						2
<i>Nerodia. sipedon</i>			1		1						2
<i>Storeria o. occipitomaculata</i>						1					1
Total Number of animals by site	12	31	42	32	12	19	2	2			152

c = calling anuran

Breaks Interstate Park Survey

Table 4. Summary of the number of amphibians and reptiles observed at each site in 2015.

Sites	1	2	3	3 ^a	4	5	6	7	8	9	10	Total
Species												
Amphibians												
<i>Aneides aeneus</i>			2	14						1		17
<i>Desmognathus fuscus</i>			3									3
<i>Desmognathus monticola</i>			13	1						6		20
<i>Eurycea cirrigera</i>			4							1		5
<i>Eurycea l. longicauda</i>			11							2		13
<i>Notophthalmus v. viridescens</i>		1	2									3
<i>Plethodon glutinosus/</i> <i>Plethodon kentucki</i>			11	9								20
<i>Plethodon richmondi</i>			1									1
<i>Pseudotriton r. ruber</i>			1									1
<i>Anaxyrus a. americanus</i>											1	1
<i>Hyla chrysoscelis</i>		2										2
<i>Lithobates catesbeianus</i>		3										3
<i>Lithobates clamitans</i>		4	2									6
<i>Lithobates palustris</i>			5					1		1		7
Reptiles												
<i>Terrapene c. carolina</i>										1	1,1S	2
<i>Plestiodon fasciatus</i>			1									1
<i>Sceloporus undulatus</i>			2									2
<i>Agkistrodon contortrix mokasen</i>			3							1		4
<i>Diadophis punctatus edwardsii</i>		2									2	4
<i>Nerodia. sipedon</i>		1										1
<i>Opheodrys aestivus</i>							1					1
<i>Thamnophis s. sirtalis</i>										1		1
Total Number of animals by site		13	61	24				1		14	4	118

3^a = night hike at site 3 on the Geological Trail and Markers 16-18 on 6-15-15 (37°17'41.36"N, 82°18'17.02"W). S = turtle shell

Annotated Checklist

Amphibians

1. *Aneides aeneus* (Green Salamander)

The Green Salamander is classified as a Tier 2 species by the Virginia Department of Game and Inland Fisheries. This designation means that it is in need of a very high level of conservation and it has a high risk of extinction or extirpation. In Virginia this species has a very limited distribution. The 2009 survey yielded four observations of this species. Green Salamanders were found clinging to the outside of rock outcrops and in rock crevices. Observations of one animal being beyond vertical and upside down on a rock face amazed all viewers. A temperature reading taken from one rock crevice was 65.6°F. In 2015, 14 Green Salamanders were found on one night hike at site 3^a which lasted for 2.5 hours. Two juvenile salamanders were found at site 3; one had a total length measurement of 4.1 cm. Salamanders were found mainly at night, most were observed in rock crevices but one adult was found in a tree crevice 1.8 m (six feet) above ground surface. Salamanders were also observed in caves and on a damp rock face near Laurel Branch stream. In June 2008, a juvenile was discovered by Virginia Natural Heritage Program staff in a rotten log at the edge of the Garden Hole parking area and adults were seen by Roble at night on rock faces along the Geological Trail.

2. *Desmognathus fuscus* (Northern Dusky Salamander)

Northern Dusky Salamanders were found at only one site in 2009. Salamanders were found mainly under rocks by the stream at site 4. One was found under a rubber inner tube by the same stream. The 2015 survey yielded only three salamanders from one site, site 3. One salamander was found under a rock by a stream, one was found in the stream, and another was found beside the stream. Larvae were present in seepage areas near site 7 in May 2014.

3. *Desmognathus monticola* (Seal Salamander)

Seal Salamanders were found in rock crevices, under rocks by streams, under logs, and in streams. Larvae were observed swimming in streams. In 2009 seven were found at site 3, fifteen were found at site 4 and one was found at site 7. During the 2015 survey, fourteen were found at site 3 and six were found at site 9.

4. *Eurycea cirrigera* (Southern Two-lined Salamander)

In 2009, two adult Two-lined Salamanders were found under rocks by a stream at site 4. In 2015, three adults and one larva were found at site 3 and one salamander was found under a rock on a cliff at site 9.

5. *Eurycea longicauda longicauda* (Long-tailed Salamander)

Long-tailed Salamanders were encountered in rock crevices and under logs and rocks. In 2009, six salamanders were collected at two sites and in 2015 thirteen salamanders were also collected at two sites.

Breaks Interstate Park Survey

6. *Plethodon glutinosus* (Northern Slimy Salamander)
7. *Plethodon kentucki* (Cumberland Plateau Salamander)

Both of these species were found during both VHS surveys in 2009 and 2015. We combined the records because of inconsistent reporting by group members of the physical characteristics of each slimy salamander found. These species are hard to differentiate and many group members had difficulty making a positive identification. We emphasized to group members that every animal seen did not have to be touched. Highton et al. (1989) used protein electrophoresis to differentiate between and describe sixteen different species in the *Plethodon glutinosus* species complex. These protein markers were used to positively identify *P. glutinosus* and *P. kentucki* after the 2009 survey, as described in:

<http://www.virginiaherpetologicalsociety.com/research/electrophoresis/>

In 2009 we found 28 slimy salamanders and in 2015 we found 20. Both juvenile and adult salamanders were observed. Slimy salamanders were found under logs, in rock crevices, on leaf litter, and on the walls of wet caves.



Plethodon kentucki above and *P. glutinosus* below.

8. *Plethodon richmondi* (Ravine Salamander)
Only one juvenile Ravine Salamander was found under a log at site 3. This was observed during the 2015 survey.
9. *Pseudotriton ruber ruber* (Northern Red Salamander)
In 2015, one juvenile Northern Red Salamander was found under a rock in water at site 3.



10. *Notophthalmus viridescens viridescens* (Red-spotted Newt)

In 2009, seven Red-spotted Newts were found in a variety of habitats including Beaver Pond, the shoreline of Laurel Lake, on a road at night, and on the path at Tower Tunnel Trail. Adults and eft stage newts were seen. In 2015 only three newts were found. These newts were observed in Beaver Pond, Laurel Lake, and leaf litter at site 3.

11. *Anaxyrus americanus americanus* (American Toad)

The first VHS survey conducted at Breaks Interstate Park found one American Toad in a debris pile at site 5 and another was found foraging in leaf litter at the Tower Tunnel Trail. Seven toads were found on the road while road cruising at night. During the second survey, one adult American Toad was found in leaf litter in the woods surrounding the Mountain Bike Trail at site 10. Tadpoles were observed by Roble in a small road rut near Beaver Pond and along the margins of the Russell Fork River in early May 2014.

12. *Hyla chrysoscelis* (Cope's Gray Treefrog)

Only calling males were found during the 2009 and 2015 surveys conducted by the VHS. In 2009, one lone *Hyla chrysoscelis* male was heard calling at the Beaver Pond during a night hike. In 2015, two calling Cope's Gray Treefrogs were heard calling from the woods surrounding Beaver Pond at site 2. A large chorus of *H. chrysoscelis* was heard at Laurel Lake in early May 2014.

13. *Lithobates catesbeianus* (American Bullfrog)

In 2009, American Bullfrogs were heard vocalizing at two sites; at the shore of the Beaver Pond and at the shoreline of Laurel Lake. In 2015, three adults were observed along the edge of Beaver Pond at site 2.

14. *Lithobates clamitans* (Green Frog)

Green Frogs were found on the shoreline of Laurel Lake and Beaver Pond, along the edge of Laurel Branch, by a spring at site 3 and on the road at night. Many males were heard vocalizing at night at sites 1 and 2 in 2009. During the 2015 survey three adults and one metamorph were observed at site 2. The adults were seen at the edge of Beaver Pond and the metamorph was found at the edge of the stream feeding the pond. One male was heard calling at this site. Additionally, two Green Frogs were seen in a seep by the dam forming Laurel Lake at site 3. At least one adult male was present at the spring at site 7 in May 2014.

Breaks Interstate Park Survey

15. *Lithobates palustris* (Pickerel Frog)

In 2009, *Lithobates palustris* was the most widespread anuran found during the survey period. Pickerel Frogs were observed along the shore of Laurel Lake, sitting on the Beaver Pond Trail at night, sitting on the earthen dam path leading to Laurel Branch Trail, along the edge of Laurel Branch stream, around debris piles, and in the pool parking lot at night. In 2105, five Pickerel Frogs were found at site 3; two adults and three juveniles. These frogs were observed in leaf litter, in the water in a spring coming out of a rock, and one was found under a log. One adult was found at site 7 in leaf litter by the trail. One adult was also observed in Center Creek at site 9.

16. *Pseudacris crucifer* (Northern Spring Peeper)

Northern Spring Peepers were only observed in the VHS survey in 2009. During that survey, one metamorph peeper was collected on the shore of Laurel Lake and numerous males were heard calling at night from the shoreline of Beaver Pond. Virginia Natural Heritage Program staff photographed a metamorph at Beaver Pond in June 2008. Large choruses of both *P. crucifer* and *H. chrysoscelis* were present at Laurel Lake in early May 2014.

17. *Pseudacris brachyphona* (Mountain Chorus Frog)

While road cruising at night in 2009, one male Mountain Chorus Frog was heard vocalizing near the lodge close to the entrance gate. A search of the area did not yield a chorus frog. In June 2008, Roble heard a nocturnal breeding chorus when standing at the Stateline Overlook. The frogs were apparently calling from somewhere along the Russell Fork River floodplain below, though it was uncertain if they were in Virginia or Kentucky. Later that same week Roble and Richard Hoffman also heard a male calling at a site at least 100 meters below Beaver Pond.

Reptiles

18. *Chelydra serpentina* (Eastern Snapping Turtle)

Three adult snapping turtles were caught in baited hoop turtle traps set in Laurel Lake in 2009. Roble observed one adult in the Russell Fork River in 2014.

19. *Terrapene carolina carolina* (Eastern Box Turtle)

A single adult female Eastern Box Turtle was found wedged under a log at a debris pile at site 5. One male turtle was found in the leaf litter at site 9. One shell and one adult male were found in a grassy field beside the Mountain Bike Trail at site 10. Roble found two shells in May 2014, one near Beaver Pond and the other in a Hemlock ravine.

20. *Plestiodon fasciatus* (Common Five-lined Skink)

Only two Common Five-lined Skinks were observed during the two VHS surveys. One skink was spotted around a debris pile at site 5 and one male skink was observed on a tree at site 3. In May 2014, a male was seen near the confluence of Grassy Creek and Russell Fork River (site 9 area).

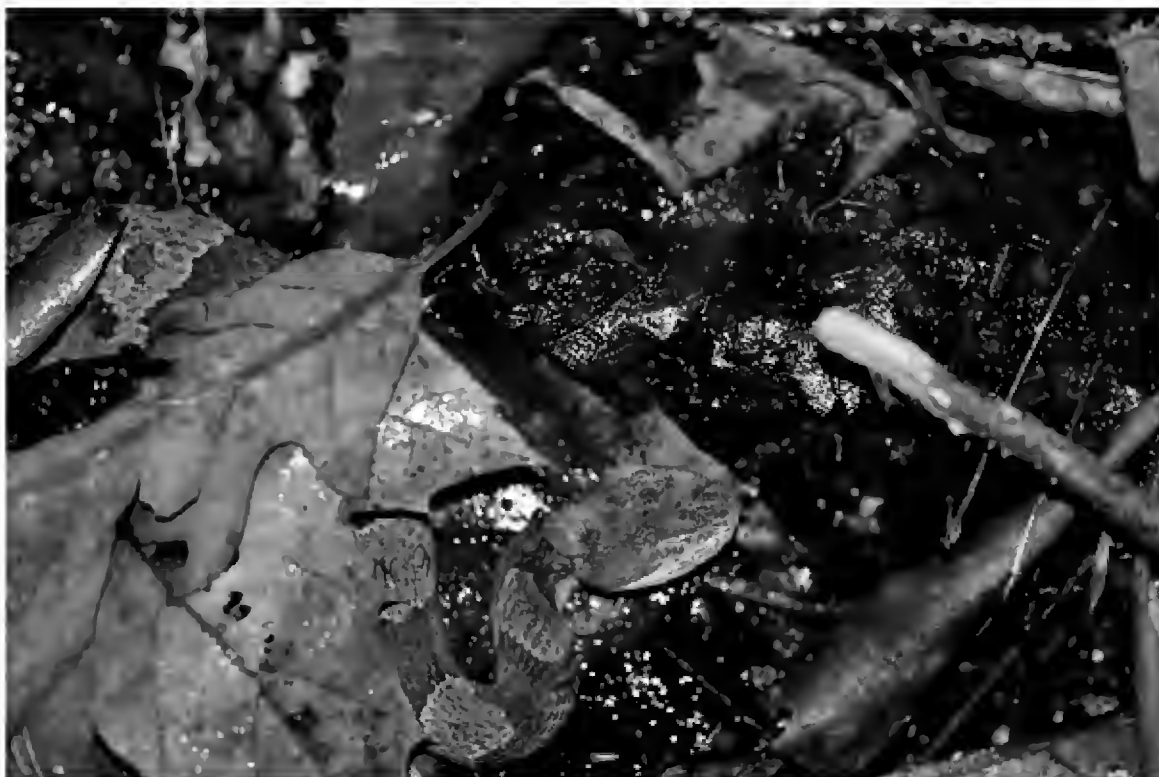
21. *Sceloporus undulatus* (Fence Lizard)

Fence Lizards were observed on logs and rocks around the debris piles at site 5 and two adults were observed basking on a rock outcrop at the Stateline Overlook at site 3. In

May 2014, a juvenile was observed near the Geological Trail parking lot and two adults were seen near the Stateline Overlook, including an adult male performing push-up display behavior on a flat rock. On 13 May 2015, Roble observed an adult male on a log along Prospector Trail, about midway between the River Trail and Tower Tunnel Trail.

22. *Agkistrodon contortrix mokasen* (Northern Copperhead)

Northern Copperheads were found at sites 3 and 9. At site 3 one snake was found foraging in leaf litter at the base of a rock canyon in 2009. In 2015 three Northern Copperheads were found at site 3 and one was found at site 9. The snakes found at site 3 included an adult found under tree roots near a seep, one juvenile in leaf litter, and one neonate, still exhibiting the sulfur-colored tail, at the base of a rock outcrop in leaf litter. The juvenile snake found at site 9 was observed on a rock ledge in an outcrop of rocks above the walking trail. In June 2008, Roble observed an adult copperhead at night on a large boulder along the Geological Trail.



23. *Diadophis punctatus edwardsi* (Ring-necked Snake)

In 2009, two Ring-necked Snakes were found at two sites, one was found under bark and the other was found under tin at the debris pile at site 5. In 2015, one adult was found DOR at the intersection of the road leading to cottages and Deer Trail leading to Beaver Pond. This animal had no spots on its ventrum and a full neck band. A live adult was found under tree bark in the woods surrounding Beaver Pond at site 2. It also lacked spots on its ventrum and had a full neck band. Two adults were found under fallen tree bark at site 10.

24. *Lampropeltis triangulum triangulum* (Eastern Milksnake)

Roble observed an adult crossing Garden Hole Road near the parking area at Russell Fork River in June 2008 (see Roble and Hoffman, 2012).

25. *Nerodia sipedon* (Northern Watersnake)

In 2009, an adult Northern Watersnake was seen basking on floating debris in Laurel Lake and a juvenile snake was found between tin at a debris pile at site 5. One shed skin found beside Beaver Pond at site 2 was found in the 2015 survey.

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26. *Opheodrys aestivus* (Northern Rough Green Snake)

One DOR specimen was found on Route 80 on the northern border of Breaks Interstate Park. Grassy Creek parallels the road where the snake was found.

27. *Pantherophis alleganiensis* (Eastern Ratsnake)

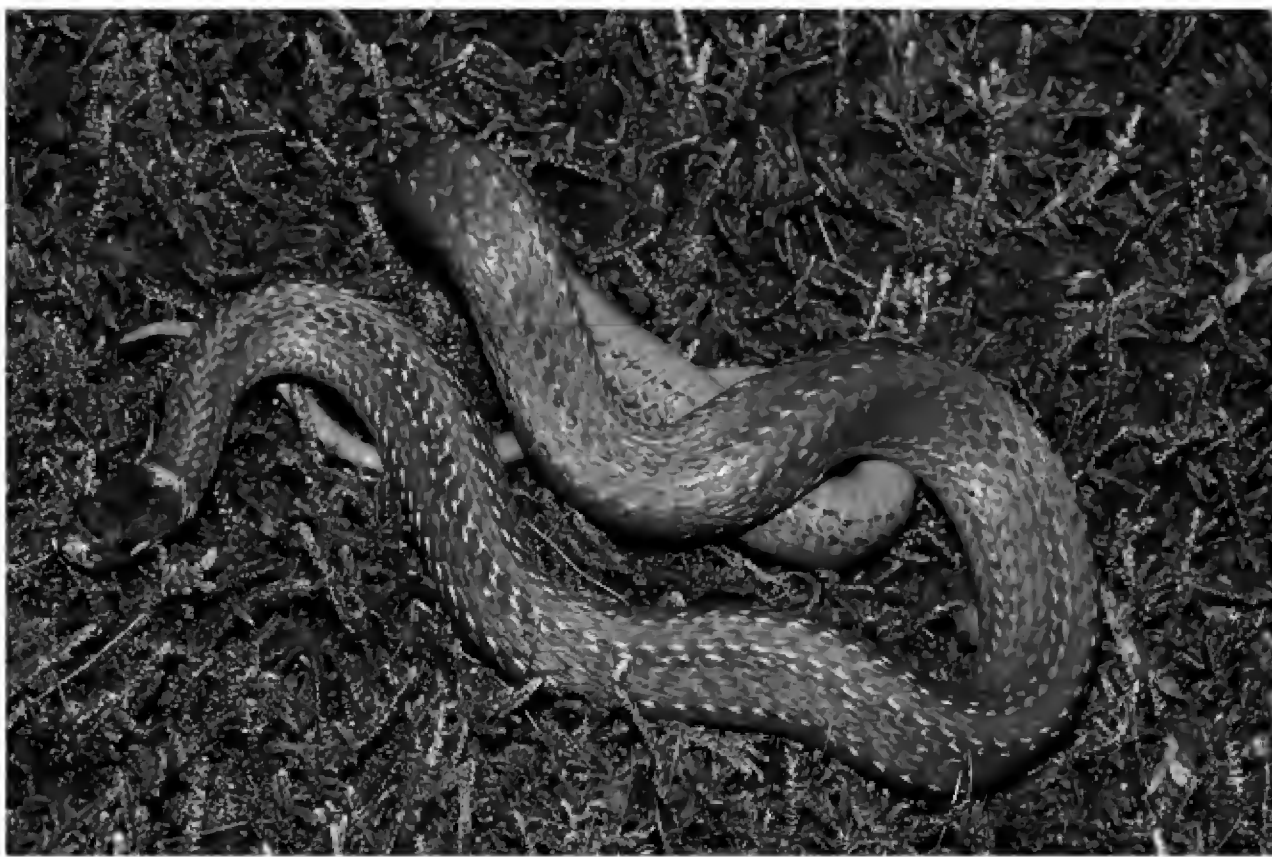
In June 2008, a DOR subadult was collected shortly after dark along the main park road by Virginia Natural Heritage Program staff.

28. *Regina septemvittata* (Queen Snake)

Roble observed a Queen Snake feeding on a recently molted crayfish in the Russell Fork River near the Garden Hole Road access in June 2008.

29. *Storeria o. occipitomaculata* (Northern Red-bellied Snake)

A single large adult Northern Red-bellied Snake was collected alive crossing the road leading to the campground during the 2009 survey. This represents an unusual observation because this species is not often observed in the day except under cover objects (Palmer and Braswell, 1995; Mitchell, 1994) and there is only one other known locality in the mountains of the southwest corner of the state (Scott County; FWIS Database).



30. *Thamnophis s. sirtalis* (Eastern Gartersnake)

One adult was found on a rock shelf at site 9.

Discussion

Breaks Interstate Park is located in one of the most remote areas in the Commonwealth. The rugged terrain and scarcity of improved roads is one of the major reasons the Park was originally established. Judging from the low number of amphibians and reptiles in the Virginia Department of Game and Inland Fisheries' Fish and Wildlife Information Service Database, it has not been subjected to many previous surveys. There were only 18 species of amphibians and 11 species of reptiles confirmed for Dickenson County prior to the recent surveys. The surveys reported here found 14 of the 18 amphibian species and 10 of the 11 reptile species (Table 5), making these

some of the most successful surveys to date. In addition, three species of amphibians and three species of reptiles not previously vouchered were reported, and one species of reptile (*Storeria o. occipitomaculata*) not found in the FWIS Database as even likely, was vouchered. The large number of species found highlights the real value of the VHS surveys, that so many eyes are available to find secretive animals. Many members go out on informal personal surveys and find many of the common species in an area. However, when more than a dozen people are looking, even many of the less common species are turned up. A special thank you goes to all members who made the long trek to participate in these surveys.

The three amphibian species newly vouchered by these surveys include *Pseudacris crucifer*, *Pseudotriton r. ruber*, and *Eurycea cirrigera*. Each of these species is documented from virtually all surrounding counties and thus not unexpected. Their lack of documentation prior to these surveys is probably more a factor of the lack of previous work in this region. The four species we failed to find were *Lithobates sylvaticus*, *Desmognathus ochrophaeus*, *Gyrinophilus porphyriticus*, and *Pseudotriton montanus*, each represented by one or two localities in the county, and usually a single specimen at each site (FWIS Database). Other amphibian species that may occur in the Park include *Anaxyrus fowleri*, *Cryptobranchus a. alleganiensis*, *Eurycea lucifuga*, and *Necturus m. maculosus*. All these species are found in other counties in the area and may occur in Dickenson County as well. It is particularly of interest whether *Cryptobranchus* and *Necturus* may occur in Russell Fork. Both were found in the 1994 Survey of Copper Creek (Sattler, 1994) in the Tennessee River drainage in Russell and Scott Counties to the south. Neither has been found in the Appalachian Plateau Big Sandy drainage in Virginia. The Hellbender is known from Wayne County, and the Mudpuppy from Wayne and Mingo Counties WV which include part of the Big Sandy drainage (Green and Pauley, 1987). Russell Fork is a formidable river, being the most dangerous whitewater rafting river in the eastern United States (Scales, 2011) and very difficult to survey. It is interesting to speculate as to what may be hiding in its waters. With eDNA technology becoming used on a routine basis, surveys for Hellbender and Mudpuppy DNA in this area should be conducted.

The three reptile species newly vouchered for Dickenson County are *Agkistrodon contortrix mokasen*, *Pantherophis alleghaniensis*, and *Storeria o. occipitomaculata*. Two of these, the Copperhead and Eastern Ratsnake are found in some of the surrounding counties, are widespread species and not unexpected (FWIS Database). The Northern Red-bellied Snake is only the third specimen from the southwest corner of the state. It joins a pair of specimens from the southeastern corner of Scott County collected in 2009 (FWIS Database). This new record verifies Mitchell's (1994) claim it occurs throughout Virginia despite a lack of verified records in some areas. The one reptile species previously recorded from Dickenson County but not found in the recent surveys is *Heterodon platirhinos*. This species does not appear to be common in the southwestern corner of the state and is represented in the county by a single specimen from near Clintwood (FWIS Database) and is documented in only Tazewell and Smyth counties (Mitchell, 1994) in the area. Reptiles that may still await discovery at Breaks Interstate Park include *Coluber c. constrictor*, *Carphophis a. amoenus*, *Crotalus horridus*, *Lampropeltis getula* and *Lampropeltis nigra*. Although not formally documented from Dickenson County, Austin Bradley (pers. comm.), the current superintendent, reports that Timber Rattlesnakes have been observed in the park. Most of the above species are found in at least one other county in the Appalachian Plateau (Mitchell and Reay, 1999).

Certainly the highlight of the VHS surveys was finding a large number of Green Salamanders. This striking species was not uncommon, particularly on night hikes along the limestone cliffs. It was extensively photographed by day and night, and was the first time many of the

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survey participants were able to observe this species. The Park is well situated to preserve this important population. The recent find of Bd in this population is of concern (Blackburn et al., 2015). Moffitt et al. (2015) suggest that Bd could be a factor in addition to habitat loss and climate change in the decline of this species. Because the Breaks has a large population of Green Salamanders and is protected habitat, we would like to see the situation monitored over time. The Park is heavily visited throughout the year, it is possible that visitors may unintentionally bring in viral or fungal infections. We recommend that those involved with future surveys not touch the animals and take special precautions to disinfect all shoes and equipment, both as a protection for the salamanders in the Park, and to prevent the spread of Bd from these infected animals to other areas. Park managers should ensure any researchers coming into the park maintain strict disinfection protocols. This should be written into the rules for the collecting permit.

Table 5. Summary of species found in Breaks Interstate Park, Dickenson County, Virginia during each survey.

	Roble et al. 2008, 2014	Gibson & Sattler 2009	Gibson & Sattler 2015
<i>Aneides aeneus</i>	*	*	*
<i>Desmognathus fuscus</i>	*	*	*
<i>Desmognathus monticola</i>		*	*
<i>Eurycea cirrigera</i>	*	*	*
<i>Eurycea l. longicauda</i>	*	*	*
<i>Notophthalmus v. viridescens</i>	*	*	*
<i>Plethodon glutinosus</i>	*	*	*
<i>Plethodon kentucki</i>	*	*	*
<i>Plethodon richmondi</i>			*
<i>Pseudotriton r. ruber</i>			*
<i>Anaxyrus a. americanus</i>	*	*	*
<i>Hyla chrysoscelis</i>	*	*	*
<i>Lithobates catesbeianus</i>	*	*	*
<i>Lithobates clamitans</i>	*	*	*
<i>Lithobates palustris</i>	*	*	*
<i>Pseudacris brachyphona</i>	*	*	
<i>Pseudacris crucifer</i>	*	*	
Reptiles			
<i>Chelydra serpentina</i>	*	*	
<i>Terrapene c. carolina</i>	*	*	*

<i>Plestiodon fasciatus</i>	*	*	*
<i>Sceloporus undulates</i>	*	*	*
<i>Agkistrodon contortrix mokasen</i>	*	*	*
<i>Diadophis punctatus edwardsi</i>		*	*
<i>Pantherophis alleghaniensis</i>	*		
<i>Lampropeltis t. triangulum</i>	*		
<i>Nerodia s. sipedon</i>	*	*	*
<i>Opheodrys aestivus</i>			*
<i>Regina septemvittata</i>	*		
<i>Storeria o. occipitomaculata</i>		*	
<i>Thamnophis s. sirtalis</i>			*

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2009 Survey Members: Jason Gibson, Kyle and Josiah Harris, Bonnie and Rich Keller, Nancy and Paul Sattler, Kory, Elijah, and Emily Steele, Susan Watson, John, Charise, Amy, and Jennifer White



2015 Survey Members: Craig Abbott, Sarah Colletti, Jason, Mark, and Grant Gibson, Tim Higgins Jr., Tim and Jude Higgins, Tom Holman, Dave Perry, Chris Risch, Steve Roble, Paul and Nancy Sattler, Julie Slater, Aaron, Christy, Brian, and Elan VanArnum, and Dave and Wes VanGelder.



Virginia Natural Heritage Program staff and volunteers

2008 surveys – Art Evans, Anne Chazal, Maureen Donnelly, Paul Bedell, Richard Hoffman, Will Merritt, and Chris Wirth.

2014 surveys – Anne Chazal

Breaks Interstate Park staff:

Austin Bradley (current superintendent), Karl Mullins (retired naturalist)

Matt O'Quinn - previous superintendent (now manager of Powhatan State Park)

A Herpetological Survey of James River State Park

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Introduction

Annually the VHS picks a survey site in a location where little to no previous work has been conducted. James River State Park was selected because it met this criterion and appeared to have suitable habitat and facilities to host the VHS's largest yearly event. James River State Park is located in the middle of the James River watershed basin. This unique area serves as a crossroads of sorts where warm-loving species and cold-loving species ranges are ending or beginning. The location of this park is special in that the James River headwaters carve a path through the north/south mountains in Virginia and the river flows to the coastal plain. Being located in the piedmont, sandwiched between mountains to the west and the coastal plain to the east, the James River basin corridor has allowed the expansion and contraction of psychrophilous and thermophilous reptiles and amphibians as the climate has warmed and cooled throughout the past (Hoffman, 1987). The Piedmont can have a unique assemblage of species with a mix of cold and warm adapted animals. It was hoped that by selecting this park some interesting information could be gained about the biogeography of amphibians and reptiles in the area.

The James River watershed comprises about 25,900 square kilometers and covers approximately 25% of the state. Flowing through the drainage basin is the James, a 547 kilometer long river. This river begins in the Allegheny Mountains and flows in a west to east direction and empties into the Chesapeake Bay. Some 37 counties and 19 cities are impacted by the watershed. The Virginia Herpetological Society has surveyed sites within the upper, middle, and lower James numerous times (see discussion below).

James River State Park is located in Gladstone, Virginia and is found in Buckingham County. The park opened June 20, 1999. It is found in the piedmont physiographic province and the elevation ranges from 110 to 206 meters. The park consists of 632 hectares and has many trails, ponds, camping areas, and river front access for use by the public. The public mainly uses this park for camping, hiking, fishing, river access, and horseback riding.

Study Sites

James River State Park was divided into eleven distinct sites to survey. Because of limited groups and time, Sites 5 and 7 were not able to be examined during this survey. The sites which were surveyed are found below.

Site 1 (37° 36' 54.30"N, 78° 48' 37.05"W) This site was in the Southwestern corner of the Park, along the James River. It included the river, meadows and woodlands parallel to the river.

Site 2 (37° 37' 11.61"N, 78° 49' 9.88"W) Site 2 occupied the northwest side of the Park, along the James River. It included the River Trail, Cabell Creek Connector Trail and freshwater impoundments along the river. Dominant trees included the Silver Maple, Sycamore, Walnuts, and Box Elders. The understory included stinging nettle.

Site 3 (37° 37' 51.51"N, 78° 48' 59.19"W) Site 3 occupied a long narrow section along the northern side of the Park, along the James River. It included the River Trail which parallels the James River, and freshwater impoundments in the floodplain. Dominant trees included Silver Maple, Sycamore and Box Elder. The understory consisted of a lot of grasses along the River Trail, Raspberries and Poison Ivy.

Site 4 (37° 38' 10.58"N, 78° 47' 49.22"W) Site 4 occupied the northeastern side of the Park. It included the Branch Trail, Branch Pond Loop Connector Trail, and Branch Pond. The upland forest consisted of mixed pines and hardwoods

Site 6 (37° 37' 40.08"N, 78° 47' 48.61"W) Site 6 occupied the South central portion of the Park. It consisted of a mixed hardwood/pine forest with Loblolly Pine, Red Oak, Sassafras, Tulip Poplar, Sugar Maple, Red Maple, Dogwood and Beech. The understory included Devil's Walking Stick, Paw Paw and Lycopodium. The site included part of the stream leading to Branch Pond.

Site 8 (37° 37' 28.45"N, 78° 48' 31.19"W) Site 8 occupied the center of the Park. This site included Taylor Pond with the Cabin Loop Trail and two small vernal pools off the Dixon Trail. The terrain consists of upland Hardwood forest with Sweet Gum, Beech, Sugar and Red Maple, Tulip Poplar and White Oak predominating.

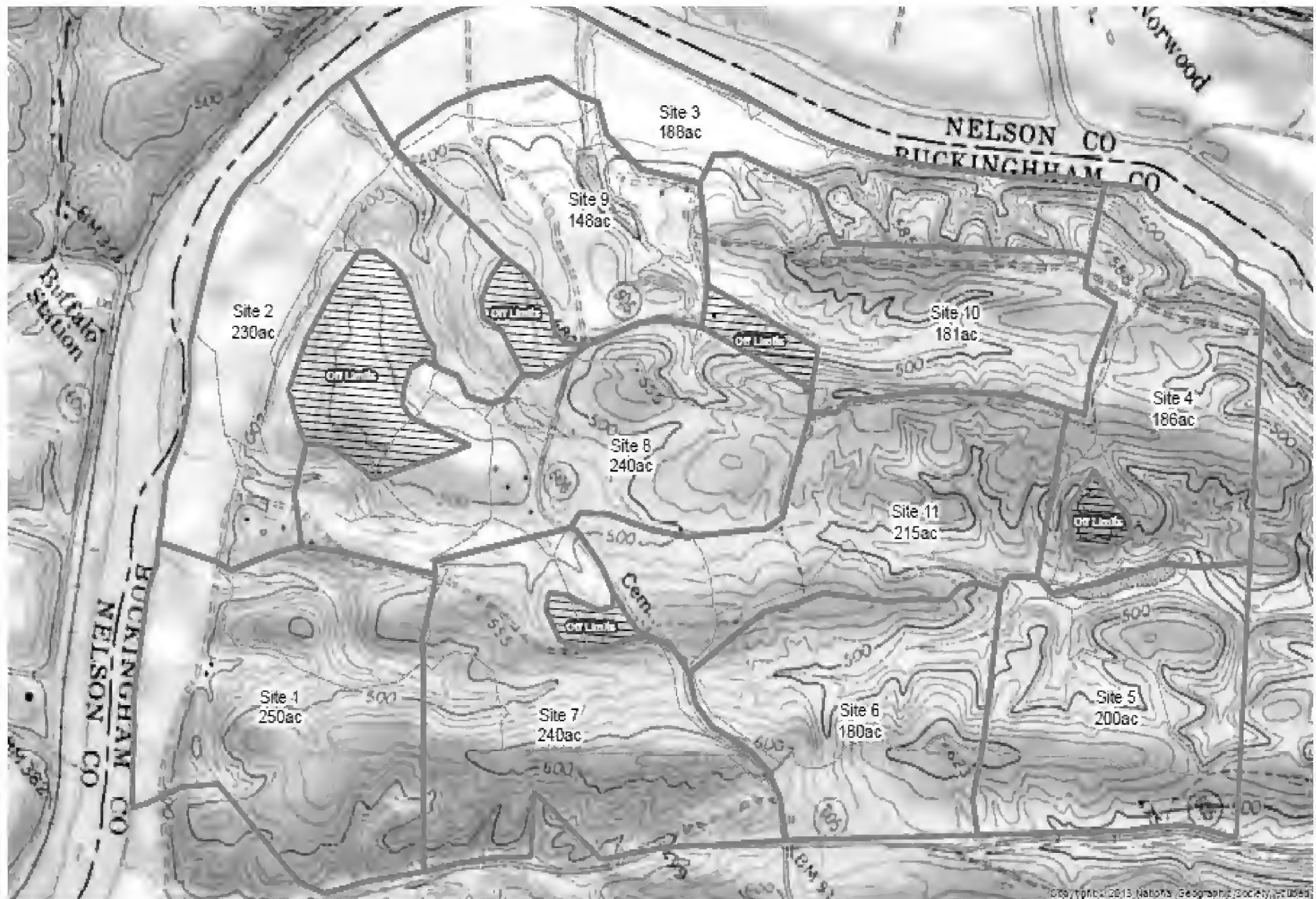
Site 9 (37° 37' 37.50"N, 78° 48' 56.19"W) Site 9 occurred in the central northern portion of the Park. It included Green Hill Pond and its Loop Trail, the stream coming out of Green Hill Pond, and portions of the Cabell and Dixon Trails. Dominant trees include Beech, Box Elder, Hickory, White Oak, Sweetgum, Dogwood, Red Maple and Lowbush Blueberries in the understory.

Site 10 (37° 38' 18.15"N, 78° 47' 58.45"W) Site 10 is located in the northern portion of the Park. It consists of rolling hills on a high ridge overlooking the floodplain of the James River. It includes the northern portion of the Cabell Trail down to the Tye River Overlook.

Site 11 (37° 37' 50.29"N, 78° 48' 0.84"W) Site 11 was located in the center of the Park, consisting of upland hardwood forest with White Oak, Red Cedar, American Birch, Tulip Poplar, Sassafras, Sycamore, Red Oak and Chestnut Oak. The understory included Blueberry, Mountain Laurel, Paw Paw and Lady Slipper Orchids.

James River State Park Survey

Figure 1. Map showing survey areas.



Materials and Methods

During the survey weekend of 17-18 May 2014, 50 volunteers were divided into 8 survey groups. Each survey group was tasked to survey a specific site for the duration of the survey time period on 17 May. Additional sites were surveyed on 18 May. Survey techniques included dipnetting, overturning cover objects, visual encounter, listening for calling anurans, use of baited hoop turtle traps, hand capture, and observing roads for live and dead animals. Visual inspections were made of animals hand captured. These inspections looked for malformations, injuries, disease, and parasitic infections. Individual group leaders were tasked with recording all observations on standardized recording sheets. Digital photographs were taken of species thought to be rare, diseased, or county records.

Results

A total of 16 species of amphibians (eight anurans and eight salamanders) and 18 species of reptiles (five turtles, three lizards, and ten snakes) were found during the weekend survey. A total of 413 animals were found from Saturday to Sunday. Two new county records were found and include *Scincella lateralis* and *Storeria o. occipitomaculata*. A juvenile albino Northern Watersnake was discovered on the edge of a small stream at Site 2. Two species, *Lithobates palustris* and *Desmognathus fuscus* were found to be parasitized by intradermal trombiculid mite larvae. Table 2. summarizes the species and numbers of animals found at each survey site.

Table 2. Summary of the number of animals observed at each site, James River State Park.

Site	1	2	3	4	6	8	9	10	11	Total
Amphibians										
<i>Acris crepitans</i>	9	18	15	8		4	34	4		92
<i>Anaxyrus a. americanus</i>							1			1
<i>Anaxyrus fowleri</i>	1		4	1	1					7
<i>Hyla versicolor</i>						1C,1				2
<i>Lithobates catesbeianus</i>			1C 3,			1				2
<i>Lithobates clamitans</i>	1		2C	1C	1	2	1C			11
<i>Lithobates palustris</i>	2				1		1			4
<i>Pseudacris crucifer</i>						1, 40+				41
<i>Ambystoma maculatum</i>						8E				8
<i>Ambystoma opacum</i>						6L				6
<i>Desmognathus fuscus</i>	14	2		15	7					38
<i>Eurycea cirrigera</i>	2			1	7					10
<i>Notophthalmus v. viridescens</i>	5	6	1	6	5	2	24	11	4	64
<i>Plethodon cinereus</i>	11	7		3		1			7	29
<i>Plethodon cylindraceous</i>		1			3			1		5
<i>Pseudotriton r. ruber</i>				1	2			2		5
Reptiles										
<i>Chelydra serpentina</i>			4							4
<i>Chrysemys p. picta</i>			3					1		4
<i>Pseudemys c. concinna</i>			1				1	3		5
<i>Sternotherus odoratus</i>								2		2
<i>Terrapene c. carolina</i>	2	1		1	2			1	1	8
<i>Plestiodon fasciatus</i>	1	1		2	1	3		6		14
<i>Sceloporus undulatus</i>	1				1	3		2		7
<i>Scincella lateralis</i>		1								1
<i>Agkistrodon contortrix mokasen</i>	1									1
<i>Carphophis a. amoenus</i>	4	2		3	1	3	1	4	1	19
<i>Coluber c. constrictor</i>	3					1				4
<i>Diadophis punctatus</i>		1		1						2
<i>Heterodon platyrhinos</i>		1	1							2
<i>Nerodia s. sipedon</i>		1	3			1				5
<i>Opheodrys aestivus</i>		1						1		2
<i>Pantherophis alleghaniensis</i>	1		2	1S		1				5
<i>Storeria o. occipitomaculata</i>	1									1
<i>Thamnophis s. sirtalis</i>			2							2
	59	43	42	44	32	79	63	38	13	413

E=eggs, L=larvae, C=calling males.

James River State Park Survey

Annotated Checklist

Amphibians

Anurans

1. *Acris crepitans* (Eastern Cricket Frog) Cricket Frogs were found at Sites 1, 2, 3, 4, 8, 9 and 10. It was the most numerous Amphibian found in the Park with a total of 92 recorded. They were found along creeks, on the short of ponds, and along the shore of the freshwater impoundments along the River.
2. *Anaxyrus a. americanus* (American Toad) A single American Toad was found at Site 9. It was found along the stream draining Green Hill Pond into the James River.
3. *Anaxyrus fowleri* (Fowler's Toad) Fowler's Toad was the more common toad found at James River State Park, which is not unexpected considering the sandy soil found along the river. They were found at Sites 1, 3, 4 and 8. They were found in a variety of habitats, including the grassy area around a barn, in the leaf litter in the forest, and along the River Trail near the James River.
4. *Hyla versicolor* (Gray Treefrog) On May 31, 2014, prior to the survey during one of the preliminary scouting trips with Mike Hayslett, one Gray Treefrog was heard and another seen near the vernal pools at Site 8.
5. *Lithobates catesbeianus* (American Bullfrog) Bullfrogs were reported from Sites 3 and 8. The Bullfrog at Site 3 was calling from one of the large freshwater impoundments along the river. The one at Site 8 was a large adult seen in one of two vernal pools.
6. *Lithobates clamitans* (Green Frog) Green Frogs were seen and heard at Sites 1, 3, 4, 6 and 8. The Green Frog at Site 1 was found dead in a marsh area. Others were either seen or heard calling from the ponds and vernal pools in the Park.
7. *Lithobates palustris* (Pickerel Frog) Pickerel Frogs were observed at Sites 1, 6 and 9. They were reported from streams and their banks. One found under a rock in a stream at Site 1 was infested with intradermal trombiculid mite larvae.
8. *Pseudacris crucifer* (Spring Peeper) Spring Peepers were found at one of the vernal pools in Site 8. One adult was observed on the bank of the pool and more than 40 tadpoles were observed in the pool.

Salamanders

9. *Ambystoma maculatum* (Spotted Salamander) One adult and 8 egg masses of Spotted Salamanders were observed in the vernal pools at Site 8. The eggs had already hatched.
10. *Ambystoma opacum* (Marbled Salamander) Six Marbled Salamander larvae were dipnetted from one of the two vernal pools on Site 8.

11. *Desmognathus fuscus* (Northern Dusky Salamander) Northern Dusky Salamanders were found at Sites 1, 2, 4 and 6. Most were found under rocks in streams or under logs near streams. One from under a rock in a stream and one from under a log on land were found to be parasitized by intradermal trombiculid mite larvae.

12. *Eurycea cirrigera* (Southern Two-lined Salamander) Adult and larval Southern Two-lined Salamanders were found at Sites 1, 4 and 6. All were found in or along streams.

13. *Notophthalmus v. viridescens* (Red-spotted Newt) Newts were found at all nine sites surveyed. Most were the terrestrial eft stage found under logs or rocks on the forest floor, but some adults were found in the large water impoundments in the river's floodplain.

14. *Plethodon cinereus* (Eastern Red-backed Salamander) Red-backed Salamanders were found at Sites 1, 2, 4, 8 and 11. All were found under logs on the forest floor.

15. *Plethodon cylindraceus* (White-spotted Slimy Salamander) Slimy Salamanders were found at Sites 2, 6 and 10. All were found under logs on the forest floor.

16. *Pseudotriton r. ruber* (Northern Red Salamander) Red Salamanders were found within Sites 4, 6 and 10. All were found under logs on the forest floor.

Reptiles

Turtles

17. *Chelydra serpentina* (Snapping Turtle) Snapping Turtles were caught in a hoop trap in a large freshwater impoundment within Site 3.

18. *Chrysemys p. picta* (Eastern Painted Turtle) Painted Turtles were observed in the water or basking within Sites 3 and 9. At Site 3 one was observed basking on a mat of brambles about a meter from the shore and another in the water. Another was observed basking in Green Hill Pond in Site 9.

19. *Pseudemys c. concinna* (Eastern River Turtle) River Turtles were observed within Sites 3, 8 and 9. Several were observed basking in the James River or Green Hill Pond. A hoop trap set in Taylor Pond caught a male which was photographed prior to release.

20. *Sternotherus odoratus* (Eastern Musk Turtle) Two Musk Turtles were observed in Site 9. One was in an herbaceous wetland area and the other on a trail between streams.

21. *Terrapene c. carolina* (Eastern Box Turtle) Box Turtles were found in Sites 1, 2, 4, 6, 10 and 11. One was found dead, another shell was found. Others were out foraging although one was found under a brush pile.

Snakes

22. *Agkistrodon contortrix mokasen* (Northern Copperhead) A single copperhead was found under a tarp near a barn in Site 1.

23. *Carphophis a. amoenus* (Eastern Wormsnake) Wormsnakes were found in every site sampled except Site 3. They were found under rocks or logs, inside rotten logs, or under the bark of old logs.

James River State Park Survey

24. *Coluber c. constrictor* (Northern Black Racer) Racers were found at Sites 1 and 8. They were found in a brush pile, under a tarp and one was crossing the road by the cabins. One of the Racers from under a tarp showed scars from a past injury.

25. *Diadophis punctatus* (Ring-necked Snake) Ring-necked Snakes were found one each in Sites 2 and 4. Both were found under logs in a forest habitat.

26. *Heterodon platyrhinos* (Eastern Hog-nosed Snake) Two Hog-nosed Snakes were found, one each in Sites 2 and 3. Both were found in the tall grass found along the River Trail as it runs along the James River. Both were the melanistic color phase.

27. *Nerodia s. sipedon* (Northern Watersnake) Watersnakes were found in Sites 2, 3 and 8. The one from Site 2 was a juvenile caught along a small stream which was albino. It was extensively photographed and donated to the Virginia Living Museum in hopes they would be able to maintain it in a captive setting as it was unlikely to survive in the wild. Others were observed in a small stream flowing from Green Hill Pond. One was observed basking on a tree branch along the shore of Taylor Pond.



28. *Opheodrys aestivus* (Northern Rough Greensnake) One Greensnake was observed on a log by one of the freshwater impoundments in Site 2. The other was seen in low bushes in Site 10.

29. *Pantherophis alleghaniensis* (Eastern Ratsnake) Ratsnakes were observed in Sites 1, 3, 4 and 8. A 1.2 meter adult was seen in a brush pile in Site 1. Two adults were observed along the James River, one in tall weeds along the River Trail and the second in a picnic area along the

River. A skin was found along the shore of Branch Pond. A final Eastern Ratsnake was found in grass beside a lone tree in a field near the Cabin Trail. This snake had a scar on its back from an old injury.

30. *Storeria o. occipitamaculata* (Northern Red-bellied Snake) A single Red-bellied Snake was found under a small piece of bark near the barn near Canoe Landing Road in Site 1. This represents the first record of this species in Buckingham County. A voucher photo was deposited in the VHS Archive #358.



31. *Thamnophis s. sirtalis* (Eastern Gartersnake) Two adults were found in the tall weeds growing along the River Trail near the James River in Site 3.

Lizards

32. *Plestiodon fasciatus* (Common Five-lined Skink) Both juveniles and adults were found basking on logs and buildings at Sites 1, 2, 4, 5, 6 and 8.

33. *Sceloporus undulatus* (Northern Fence Lizard) Fence Lizards were found basking on downed logs and trees at Sites 1, 5, 6, and 8.

34. *Scincella lateralis* (Little Brown Skink) A single Little Brown Skink was found running along the side of a downed log at Site 2. The lizard was captured, photographed, and released at the site of capture. A digital photograph was deposited in the VHS Archive (#359) as this represents a new record for Buckingham County.



Discussion

The Virginia Herpetological Society is beginning to have a major impact on how we view the distribution of reptiles and amphibians in Virginia. By sponsoring the journal *Catesbeiana* we allow authors to publish articles and field notes on species' distributions. The society also conducts at least two surveys each year, an annual spring survey and a HerpBlitz survey which allows members to aid in collecting distributional and natural history data on Virginia's herpetofauna. This accumulated knowledge is giving a better sense of species distribution around the state. The James River Watershed is a perfect example to see how the VHS, through surveys and the publication *Catesbeiana*, has allowed us to better understand the biogeography of reptiles and amphibians in Virginia. Viewed at a watershed level, the VHS has conducted surveys and published accounts of surveys extending from the headwaters of the James to its mouth (Hoffman, 1985; Wright, 1988; Buhlmann and Hayslett, 1991; Young, 1993; Sattler, 1995; Adams et.al., 1996; Roble, 1998; Roble, 1999; Greenlee and Pinder, 2000; Gibson 2001; Gibson, 2002; Gibson and Sattler, 2004; Gibson and Hobson, 2006; Dolan and Christensen, 2007; Watson, 2008; Christensen, 2009; Gibson, 2011; Gibson and Steele, 2014; and Gibson 2015). After reading these accounts and additional field notes, one can gain an interesting biogeographic perspective on the distribution of species from an east/west point of view.

The biogeography of the piedmont can sometimes be quite complex due to the east/west contraction and expansion of species through geologic time. Some species are surprisingly absent while others not suspected are found. The following section will discuss each amphibian and reptile group making biogeographic inferences and commenting on which species might be found in subsequent surveys of this park.

Not finding *Lithobates sylvaticus* is interesting since it has been found in Cumberland County (Mitchell and Rey, 1999) and recently reported in Powhatan County several counties to the east (Whitehurst and Wright, 2010; Gibson, 2015). Perhaps this suggests that the Powhatan records, which is the easternmost record for the James River basin, represent a relict population, left over from a cooler time period. *Gastrophryne carolinensis* and *Pseudacris feriarum* are both documented for the county, but not found during this survey. Surveys during early spring or later in the summer may yield observations of these species. *Lithobates sphenoccephalus* was not seen during the survey but is documented east and west of Buckingham County. It is an early spring breeder (Mitchell, 1986), so future work at this park should search for this species during that time. *Hyla chrysoscelis* is documented one county to the east and along the James River. Cumberland County may very well represent its furthest western extension into the James River watershed basin. The last anuran that may be within the park boundaries is the secretive species *Scaphiopus holbrookii*. This species is documented in the James River watershed both upstream and downstream. The plentiful sandy sediments along the floodplain of the river is ideal habitat for this species.

Salamanders expected to be possible for the park include *Desmognathus monticola*, *Eurycea guttolineata*, *Hemidactylium scutatum* and *Ambystoma talpoideum*. *Eurycea guttolineata* is found in all surrounding counties and *Hemidactylium scutatum* and *Desmognathus monticola* are currently documented for the county (Mitchell and Rey, 1999). A cold spring within the park boundaries may even yield *Gyrinophilus p. porphyriticus*. Hayslett (2003) reports finding a large Mole Salamander metapopulation in the Piney River area of Amherst and Nelson Counties, just 20 km to the west of James River State Park. They have also been reported from Appomattox Court House National Historical Park, about 30 km to the south of the State Park (Hayslett, 2003, Mitchell, 2006). Hayslett (2003) suggests that floodplain pools along the James River in Buckingham County be examined for new populations of Mole Salamanders, similar to those found in Campbell County. Heavy rains just prior to the 2014 VHS survey put the James River at flood stage, where any small vernal pools in the floodplain would likely be underwater and inaccessible. The possibility that Mole Salamanders could be present in floodplain pools would be worth revisiting.

Turtle species that should be sought in future surveys include *Clemmys guttata* and *Kinosternon s. subrubrum*. Spotted Turtles have been found to the east and west in the James River Basin and Mud Turtles have been documented already for Buckingham County. Park managers should also be on the lookout for the invasive *Trachemys scripta elegans*. Red-eared Sliders are commonly released into ponds once pet owners get tired of caring for them.

Future surveys of this park may add three species of lizards to the park's herpetofauna: *Aspidoscelis s. sexlineata*, *Plestiodon inexpectatus*, and *Plestiodon laticeps*. Both *Plestiodon inexpectatus* and *Plestiodon laticeps* have been documented in counties adjoining Buckingham County (Mitchell and Reay, 1999). *Aspidoscelis sexlineata sexlineata* is documented widely in Virginia. Mitchell (1994) indicates that this species is most likely to be found during the warmest months, thus surveys of this park should include active searching during late June through August.

The hardest group of reptiles to find and document for the park will be the snakes. Eight snakes species have been documented for the county or found in surrounding counties but were not found during this survey: *Lampropeltis calligaster rhombomaculata*, *Lampropeltis guttata*, *Lampropeltis t. triangulum*, *Pantherophis guttatus*, *Regina septemvittata*, *Storeria d.*

James River State Park Survey

dekayi, *Thamnophis s. sauritus*, and *Virginia v. valeriae*. With a lot of effort and some luck these species may be found inhabiting the park. Some exceedingly rare and hard to find snakes like *Cemophora coccinea copei* and *Tantilla coronata* are also possible snakes which could be found in James River State Park. It is expected that *Crotalus horridus* occurs inside James River State Park. The southeastern side of Spears Mountain has undocumented reports of Timber Rattlesnakes. There have been a couple of road kills just outside the Park. One specimen was found on St. Rt. 606 just east of the James River State Park entrance. Another was found in September of 2000 about 3 km south of the Park on St. Rt. 605 (Mike Hayslett, personal communication). There are additional unconfirmed reports of Timber Rattlesnakes encountered within the Park by Park Maintenance Staff. It would be expected they occur in the Park with so many reports from the area surrounding the Park. This is a secretive species which could probably be found with sufficient search effort, in the right time of the year.

The VHS did document two species which had not been previously vouchered for Buckingham County, *Scincella lateralis*, and *Storeria occipitomaculata*. Both species are found in several other adjoining counties so their presence in Buckingham is not surprising. The species are relatively small and secretive in habits, and are easily overlooked by casual observers. Finds like these point out the importance of having a large number of eyes in one area, even if for a brief period of time. In addition, we added a second record for the red salamander (*Pseudotriton ruber*) for the county. The only other record is from near Dillwyn Virginia, about 30 km west of James River State Park, in June of 2008. Photographs were deposited in the VHS Archive (#360 and 361).

The emerging infectious diseases caused by *Batrachochytrium dendrobatidis* (Bd) and ranaviruses have been reported from areas within the James River Basin. Bd has been reported in three species of frogs and ranaviruses have been found in two species of aquatic turtles from three bodies of water from Prince Edward County (Goodman and Ararso, 2012; Goodman et.al., 2013). The impacts of these infectious pathogens to native species of amphibians and reptiles is yet to be seen. Another emerging threat to native herptiles is *Batrachochytrium salamandrivorans*. This fungal pathogen is a relative of Bd and has recently has been reported to be infecting and killing amphibians in Europe (Martel, et.al., 2014). The recent emergence of this organism in Europe is thought to have spread from Asia via the pet trade, specifically coming from Asian salamanders. This fungus causes chytridiomycosis just like Bd. Asian amphibians are immune to the effects of Bsal but scientists think that this fungus will decimate certain populations of amphibians which lack immunity if it is introduced into the United States (Yap and Koo, 2015). Though not found in the United States yet, one could easily imagine a situation where a pet owner with an infected animal could release it into a body of water and thus introduce the disease. It is suggested that even fouled tank water could accidentally release the fungus into the wild. Biosecurity plans should be developed for the park in helping to prevent the spread of these infectious diseases. At the very minimum park managers should educate the public about these threats and how each person can prevent or slow the spread.

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Determining the prevalence of Amphibian Chytrid Fungus (*Batrachochytrium dendrobatidis*) and *Ranavirus* at Long Branch Nature Center in Arlington, Virginia

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Introduction:

Emerging diseases are one of the factors responsible for population declines in both reptiles and amphibians worldwide. *Batrachochytrium dendrobatidis* (*Bd*) is a fungus that causes an infectious disease called chytridiomycosis. Amphibian chytrid fungus affects the epidermal cells of amphibians and causes electrolyte loss (Voyels et al., 2007), hyperkeratosis (Brem et al., 2007) and death in susceptible species (James et al., 2009). Some species, such as *Plethodon cinereus* (Red-backed Salamander), have anti-fungal bacteria on their skin that inhibit the growth of *Bd* (Brucker et al., 2008) while others, such as *Lithobates catesbeianus* (American Bullfrog), are asymptomatic carriers of this disease (Garner et al., 2006). *Lithobates catesbeianus* have been introduced in the western United States and South America (Daszak et al., 1999) and could be vectors for this deadly fungus. The spread of this highly virulent disease is causing rapid amphibian declines on several continents (Skerratt et al., 2007).

Ranavirus, a genus of Iridoviruses, is also a highly transmissible disease (Cinchar, 2002) primarily infecting amphibian species that breed in standing water (Harp and Petranka, 2006). This pathogen affects multiple amphibian hosts, both larval and adult, and may persist outside a host for several weeks or longer (Gray et al., 2009). *Ranavirus* appears as swelling in the limbs or body, erythema, and susceptible amphibians usually succumb to chronic cell death in their organs (Gray et al., 2009). Transmission of this pathogen occurs through direct contact with infected individuals, ingestion of infected tissue, and indirectly by contact with infected water or soil (Gray et al., 2009). This virus also affects reptiles and has been seen in wild populations of *Gopher polyphemus* (Gopher Tortoise) in Florida (Westhouse et al., 1996), *Chrysemys picta picta* (Eastern Painted Turtle) in Virginia (Goodman et al., 2013), and *Terrapene carolina carolina* (Eastern Box Turtle) in Tennessee (Allender et al., 2011) and Pennsylvania (Johnson et al., 2008). The effects of this disease are less clear than that of *Bd*, but infections are being identified in new populations and *Ranavirus* is more geographically widespread than previously thought.

Amphibian chytrid and *Ranavirus* are known to occur in Virginia (Olson, <http://www.bd-maps.net/>). A plethora of studies conducted in South-western Virginia show amphibian chytrid fungus and *Ranavirus* have been detected in a number of amphibian species such as: *Desmognathus fuscus* (Northern Dusky Salamander), *Desmognathus monticola* (Seal Salamander), *Desmognathus orestes* (Blue Ridge Dusky Salamander), *Desmognathus organi* (Northern Pygmy Salamander), *Desmognathus quadramaculatus* (Black-bellied Salamander), *Plethodon montanus* (Northern Gray-checked Salamander), *Plethodon welleri* (Weller's Salamander) (Hamed et al., 2013),

Aneides aeneus (Green Salamander) (Blackburn et al., 2015), *Notophthalmus viridescens* (Eastern Red-Spotted Newt) (Bletz and Harris, 2013), *Pseudacris crucifer* (Spring Peeper), *Lithobates catesbeianus* (Bullfrog) (Hughey et al., 2014), and *Cryptobranchus alleganiensis alleganiensis* (Eastern Hellbender) (Eskew et al., 2014). However, none of the listed studies occurred in the heavily urbanized Northern Virginia, and Long Branch Nature center (LBNC) has not been tested for both diseases. The goal of this study was to determine the presence or absence of amphibian chytrid fungus and Ranavirus in as many species as possible at LBNC. This information will be valuable to the park to influence land management decisions.

Methods:

Long Branch Nature Center is an urban park located in Arlington, Virginia and is home to an abundance of wildlife, herpetofauna in particular. Long Branch sees 12,000 visitors walk through their doors annually and the 6.9 hectare park joins with Glencarlyn Park for a continuous 49.4 hectares. The nature center is passionate about educating their guests and committed to preserving its wild lands. Long Branch is the only nature center in Northern Virginia that is permitted through the Virginia Department of Game and Inland Fisheries (VDGIF) to take in wild, injured reptiles for their rehabilitation program. This park has never been surveyed for emerging diseases and acknowledges the value in this type of research.

Long Branch Nature Center was surveyed nine times between August 2014 and June 2015. Swabbing protocols provided by the San Diego Global Disease Lab (Pessier, 2014) were used. Fine tip swabs and screw-top tubes were provided by the San Diego Zoo Disease Lab. For amphibian chytrid testing the protocols were as follows: The ventral surface of each amphibians' skin was swabbed for approximately 30 passes which included the pelvic patch (5 passes with the swab), ventral thighs (5 passes with the swab) and toe webbing of each foot (5 passes with the swab). For *Ranavirus* testing the protocols were as follows: The mouth of each amphibian was swabbed in a gentle circular motion including the tongue, roof and sides of the oral cavity. After both sampling techniques the swab was then individually placed and sealed in a provided screw-top tube. Each sample was labeled with species, date, and location collected. Samples were then stored in a freezer until it was time to submit all samples. All samples were sent to the San Diego Amphibian Disease Lab for analysis; both tests used TaqMan PCR assay techniques to test for amphibian chytrid fungus and *Ranavirus* respectively.

The following protocols were followed to avoid the potential spread of pathogens between individuals and sites visited: gloves were worn while handling individuals and were changed between specimens. A 1:10 solution of bleach to water was used to disinfect footwear before entering a new habitat.

Four different habitats were sampled: Poplar Pond (a man-made pond approximately three meters deep), Willow Pond (a vernal pool), Long Branch stream, and Salamander Creek (a tributary of Long Branch stream). We attempted to swab individuals from eight species of amphibian and *Terrapene carolina carolina* (Eastern Box Turtles) that occur in LBNC: *Lithobates catesbeianus* (American Bullfrog), *Lithobates sylvaticus* (Wood Frog), *Lithobates clamitans* (Green Frog), *Pseudacris crucifer*

Sampling for Bd and Ranavirus at Long Branch Nature Center

(Spring Peeper), *Plethodon cinereus* (Red-backed Salamander), *Eurycea bislineata* (Northern Two-lined Salamander), *Eurycea guttolineata* (Three-lined salamander), and *Ambystoma maculatum* (Spotted Salamander). Swabbing occurred over a period of 10 months to maximize the number of species sampled. For example, species such as *A. maculatum*, *L. sylvaticus*, and *P. crucifer* breed in late winter to early spring and are not frequently encountered during other times of the year.

Results:

A total of 53 animals were swabbed, 52 amphibians and 1 *T. c. carolina*. All targeted amphibians were swabbed for both *Bd* and *Ranavirus* except *E. guttolineata* and *L. clamitans* because neither species was found in the park during sampling. A total of 25 samples were submitted for amphibian chytrid fungus analysis; all but two swabs returned negative results. Two samples were positive for chytrid fungus, both were *E. bislineata* in Salamander Creek from August 27, 2014 (Table 1). A total of 28 samples were submitted for *Ranavirus*; all were negative (Table 2).

Table 1: Results of amphibian chytrid fungus testing by species over a 10 month period at Long Branch Nature Center

Common Name	Species	Chytrid Result	Date Collected
Spotted Salamander	<i>Ambystoma maculatum</i>	Negative	7/14/2015
Spotted Salamander	<i>Ambystoma maculatum</i>	Negative	3/27/2015
Spotted Salamander	<i>Ambystoma maculatum</i>	Negative	4/2/2015
Spotted Salamander	<i>Ambystoma maculatum</i>	Negative	5/26/2015
Spotted Salamander	<i>Ambystoma maculatum</i>	Negative	5/26/2015
Two-lined Salamander	<i>Eurycea bislineata</i>	Negative	7/14/2015
Two-lined Salamander	<i>Eurycea bislineata</i>	Negative	8/27/2014
Two-lined Salamander	<i>Eurycea bislineata</i>	Positive	8/27/2014
Two-lined Salamander	<i>Eurycea bislineata</i>	Positive	8/27/2014
Two-lined Salamander	<i>Eurycea bislineata</i>	Negative	8/27/2014
American Bullfrog	<i>Lithobates catesbeianus</i>	Negative	7/14/2015
American Bullfrog	<i>Lithobates catesbeianus</i>	Negative	5/26/2015
Wood Frog	<i>Lithobates sylvaticus</i>	Negative	3/17/2015
Wood Frog	<i>Lithobates sylvaticus</i>	Negative	3/17/2015
Wood Frog	<i>Lithobates sylvaticus</i>	Negative	3/17/2015

Wood Frog	<i>Lithobates sylvaticus</i>	Negative	3/17/2015
Red-backed Salamander	<i>Plethodon cinereus</i>	Negative	3/17/2015
Red-backed Salamander	<i>Plethodon cinereus</i>	Negative	3/17/2015
Red-backed Salamander	<i>Plethodon cinereus</i>	Negative	3/17/2015
Red-backed Salamander	<i>Plethodon cinereus</i>	Negative	3/17/2015
Spring Peeper	<i>Pseudacris crucifer</i>	Negative	3/17/2015
Spring Peeper	<i>Pseudacris crucifer</i>	Negative	3/17/2015
Spring Peeper	<i>Pseudacris crucifer</i>	Negative	3/27/2015
Spring Peeper	<i>Pseudacris crucifer</i>	Negative	4/2/2015
Spring Peeper	<i>Pseudacris crucifer</i>	Negative	4/2/2015

Table 2: Results of *Ranavirus* testing by species over a 10 month period at Long Branch Nature Center

Common Name	Species	<i>Ranavirus</i> Result	Date Collected
Spotted Salamander	<i>Ambystoma maculatum</i>	Negative	3/27/2015
Spotted Salamander	<i>Ambystoma maculatum</i>	Negative	5/26/2015
Spotted Salamander	<i>Ambystoma maculatum</i>	Negative	5/26/2015
Spotted Salamander	<i>Ambystoma maculatum</i>	Negative	3/17/2015
Spotted Salamander	<i>Ambystoma maculatum</i>	Negative	10/1/2014
Spotted Salamander	<i>Ambystoma maculatum</i>	Negative	10/1/2014
Two-lined Salamander	<i>Eurycea bislineata</i>	Negative	10/1/2014
Two-lined Salamander	<i>Eurycea bislineata</i>	Negative	10/1/2014
American Bullfrog	<i>Lithobates catesbeianus</i>	Negative	7/14/2015
American Bullfrog	<i>Lithobates catesbeianus</i>	Negative	7/14/2015
American Bullfrog	<i>Lithobates catesbeianus</i>	Negative	5/26/2015
American Bullfrog	<i>Lithobates catesbeianus</i>	Negative	5/26/2015
American Bullfrog	<i>Lithobates catesbeianus</i>	Negative	5/26/2015
American Bullfrog	<i>Lithobates catesbeianus</i>	Negative	10/1/2014
American Bullfrog	<i>Lithobates catesbeianus</i>	Negative	10/1/2014
Wood Frog	<i>Lithobates sylvaticus</i>	Negative	3/17/2015
Wood Frog	<i>Lithobates sylvaticus</i>	Negative	3/17/2015
Wood Frog	<i>Lithobates sylvaticus</i>	Negative	3/17/2015
Wood Frog	<i>Lithobates sylvaticus</i>	Negative	3/17/2015
Red-backed Salamander	<i>Plethodon cinereus</i>	Negative	3/17/2015
Red-backed Salamander	<i>Plethodon cinereus</i>	Negative	3/17/2015
Red-backed Salamander	<i>Plethodon cinereus</i>	Negative	3/17/2015
Red-backed Salamander	<i>Plethodon cinereus</i>	Negative	3/17/2015
Spring Peeper	<i>Pseudacris crucifer</i>	Negative	3/27/2015
Spring Peeper	<i>Pseudacris crucifer</i>	Negative	4/2/2015

Sampling for Bd and Ranavirus at Long Branch Nature Center

Spring Peeper	<i>Pseudacris crucifer</i>	Negative	4/2/2015
Spring Peeper	<i>Pseudacris crucifer</i>	Negative	4/2/2015
Eastern Box Turtle	<i>Terrapene carolina carolina</i>	Negative	8/27/2014

Discussion:

This study demonstrates the importance of conducting disease screening at a local level. Having baseline data on the presence and absence of emerging infectious diseases is an important conservation measure. Although our results failed to detect *Ranavirus* and only detected chytrid fungus in two individuals, it is best to take precautions that minimize disease transmission. The two chytrid-positive *E. bislineata* appeared to be healthy and did not exhibit any outward signs of chytrid infection such as ventral redness, poor righting ability, or abnormal body postures (Pessier and Mendelson, 2010). It is worth noting that both individuals were from Salamander Creek, a headwater stream. Past studies have indicated that *Bd* was less likely to be found in headwater streams. *Batrachochytrium dendrobatidis* was detected in less than 1% of individuals sampled in headwater streams and when combined with other studies found that *Bd* had a prevalence of 3% (Hossack et al., 2010). However, it should be noted that of the 3% of individuals that were found to be chytrid positive from the combined studies, 67% of them were *E. bislineata* and *E. cirrigera* (Northern and Southern Two-Lined Salamanders). Furthermore, changing sampling techniques could increase the scope of the results; for instance, assessing amphibian chytrid fungus zoospore loads similar to the study Hossack (2010) completed. Perhaps *E. bislineata* have bacterial flora that inhibit the growth of chytrid, such as those Brucker observed in *P. cinereus* (2008). Conversely, if these individuals had a detectable zoospore count that could tell us they probably do not have a bacteria or peptide limiting the growth of chytrid on their skin. Also, they may serve as asymptomatic carriers of this disease.

Ranavirus was not detected during this study. This could be a result of the sampling methods used, as swabbing for the disease has a 22% false-negative and 12% false-positive rate when compared to other methods such as tail-clip sampling or necropsy of deceased animals (Gray et al., 2009). Oral swabbing was selected for this study because it is still a reliable way to detect *Ranavirus* and is the least invasive method compared to the aforementioned (Goodman et al., 2013). The results from this study will contribute to a larger study being conducted by Smithsonian scientists and the Virginia Department of Game and Inland Fisheries on *L. sylvaticus* tadpoles at LBNC as well as sites across the state of Virginia.

Although there was no to low presences of *Ranavirus* and amphibian chytrid fungus respectively, steps should be taken to minimize disease transmission at LBNC. Continued monitoring of these diseases in LBNC would help track the prevalence over time. The distribution and spread of these diseases is an important aspect of disease ecology and can aid in future studies and preventative methods. Protocols to reduce the spread of chytrid fungus and *Ranavirus* should also be followed. Similar to the protocols used in this study, equipment should be disinfected between sites and staff should educate visitors about the importance of disinfecting hiking equipment to prevent the spread of diseases within and outside the park. In the future, continued disease screening of both the wild animals and the captive specimens kept at LBNC would contribute to the overall knowledge of these two highly virulent diseases.

Acknowledgements:

We would like to thank the Virginia Herpetological Society, The American Association of Zoo Keepers, and Long Branch Nature Center for funding this research. We would also like to thank Cliff Fairweather and Rachael Tolman at Long Branch Nature Center, the National Capital American Association of Zoo Keepers (NCAAZK) and the other individuals who participated in this field work.

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Field Notes

Amphiuma means (Two-toed Amphiuma): VA, York Co., Beaverdam Creek in Colonial National Historical Park (37°12' N, 76°31' W). 3 June – 12 August 2015. Margarete Walden and Anne Devan-Song.

County Record: On 3 June 2015 at 22:40 PM, an adult *Amphiuma means* was observed swimming in a small temporary stream, swollen by recent rains, which feeds into Beaverdam Creek. The individual was captured by hand for positive identification (M. Walden). On 10 August 2015, 12 collapsible live bait traps (Promar #TR501, #TR503) were baited with sardines and set 750 – 850 m downstream of the first observation. A total of four individuals were trapped over the next two days (A. Devan-Song). These *A. means* measured 344 mm – 473 mm SVL, and weighed 87 g – 282 g. A digital photograph of one individual was submitted as a voucher to the VHS archives (Archive #367). Although *A. means* has been documented in several adjacent counties and is considered likely to occur in York Co., this is the first record of its confirmed occurrence in this county (Mitchell J.C. and K.K. Reay, 1999, Atlas of Amphibians and Reptiles in Virginia, Special Publication Number 1, Virginia Department of Game and Inland Fisheries, Richmond, VA, 122 pp.; and Virginia Fish and Wildlife Information Service of the Virginia Department of Game and Inland Fisheries, <http://www.vafwis.org/fwis/>).

Margarete Walden

Anne Devan-Song

University of Rhode Island

Department of Natural Resources Science

Kingston, RI 02881



***Hyla cinerea* (Green Treefrog) VA:** Spotsylvania Co., Off State Route 607 (38° 09' 35.78" N, 77° 28' 42.98" W). 17 May 2015. Brian Munford

County Record: On 17 May 2015, at approximately 20.15h, while conducting opportunistic survey work, a Green Treefrog call was noted and recorded. This habitat is a wetland "behind" the KOA Campgrounds. I offer thanks to ownership for allowing access to this area. This observation is a new county record and fills a hiatus in the distribution of this species with records in Stafford County to the north and Caroline County to the east (Mitchell J.C. and K.K. Reay, 1999, Atlas of Amphibians and Reptiles in Virginia, Special Publication No. 1, Virginia Department of Game and Inland Fisheries, Richmond, VA, 122 pp.; and FWIS Database) A digital call recording was deposited in the VHS Archives (# 368)

Brian Munford

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Richmond, VA 23225

***Lithobates virgatipes* (Carpenter Frog) VA:** Spotsylvania Co., Off State Route 607 (38° 09' 35.78" N, 77° 28' 42.98" W). 17 May 2015. Brian Munford

County Record: On 17 May 2015, at approximately 20.15h, while conducting opportunistic survey work, a carpenter frog chorus was noted and recorded. This habitat is the same wetland behind the KOA Campground as reported in the previous Field Note. This observation is a new county record and a westward expansion of the distribution of this little-documented species in Virginia (Mitchell J.C. and K.K. Reay, 1999, Atlas of Amphibians and Reptiles in Virginia, Special Publication No. 1, Virginia Department of Game and Inland Fisheries, Richmond, VA, 122 pp.) A digital recording has been deposited in the VHS Archives (# 369)

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***Lithobates virgatipes* (Carpenter Frog) VA:** King and Queen Co., on State Route 628 (37° 51' 00.14" N, 77° 07' 25.58" W). 17 May 2015. Brian Munford

County Record: On 17 May 2015, at approximately 21.45h, while conducting opportunistic survey work, a carpenter frog chorus was noted and recorded. This observation is a new county record and helps fill a gap in the middle of the distribution of this species in Virginia (Mitchell J.C. and K.K. Reay, 1999, Atlas of Amphibians and Reptiles in Virginia, Special Publication No. 1, Virginia Department of Game and Inland Fisheries, Richmond, VA, 122 pp.) A digital recording has been deposited in the VHS archives (Digital voucher # 371).

Brian Munford

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Field Notes

***Acris gryllus* (Southern Cricket Frog)** VA: Middlesex Co., State Route 618, Lovers Retreat Lane (37° 36' 49.40"N, 76° 38' 38.33"W). 7 July 2015. Brian Munford

County Record: On 7 July 2015, at approximately 21.30h, while conducting opportunistic survey work, a Southern Cricket Frog was noted and recorded. This observation is a new county record and represents a considerable northern expansion in the distribution of this species in Virginia (Mitchell J.C. and K.K. Reay, 1999, Atlas of Amphibians and Reptiles in Virginia, Special Publication No. 1, Virginia Department of Game and Inland Fisheries, Richmond, VA, 122 pp.) They have been recorded in York County to the south, but not in the intervening counties of King and Queen, Gloucester, Matthews or Essex. A digital recording has been deposited in the VHS archives (# 372).

Brian Munford

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***Opheodrys aestivus aestivus* (Northern Rough Greensnake)** VA: Fauquier Co., C.F. Phelps Wildlife Management Area (38° 25' 45.89"N 77° 44' 48.74"W). 12 October 2015. John M. Orr and Marc L. Oliphant.

County Record: While unsuccessfully hunting for squirrels on the C.F. Phelps Wildlife Management Area on 12 October 2015, we observed a Northern Rough Greensnake crossing a dirt road near Persimmon Run. A digital photograph was taken and deposited in the VHS archive (# 373). The Northern Rough Greensnake is not unexpected for Fauquier County as it has been found in all the surrounding counties, nevertheless, this first vouchered specimen for Fauquier County fills a hole in the distribution record (Toby F.J. 1985, Virginia's Amphibians and Reptiles: A Distributional Survey. Virginia Herpetological Society, Purcellville, VA. 114 pp.; Mitchell J.C. 1994, The Reptiles of Virginia. Smithsonian Institution Press, Washington DC. 352 pp.; and Mitchell J.C. and K.K. Reay 1999, Atlas of Amphibians and Reptiles in Virginia. Special Publication Number 1, Virginia Department of Game and Inland Fisheries, Richmond, VA 87pp.).

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Thamnophis sauritus sauritus (Common Ribbonsnake): VA, Warren Co., Skyline Dr at 715 m (38.82600N -78.17186W). 22 August 2010. Lance H. Benedict

County Record: On August 22, 2010 at 2026h EST a 65 cm Common Ribbonsnake was found crossing Skyline Drive approximately 300 m north of Compton Gap at an elevation of 715 m. The Common Ribbonsnake is not frequently encountered west of the Piedmont physiographic province. It has not been previously documented for Warren County by Mitchell and Reay (1999. Atlas of Amphibians and Reptiles in Virginia. Special Publication Number 1, Virginia Department of Game and Inland Fisheries. Richmond, VA 122pp.) or the Virginia Herpetological Society (<http://www.virginiaherpetologicalsociety.com/cgi-bin/herplist/action.php>). A digital photograph of the specimen was submitted to the VHS archives (#374)

Lance H. Benedict
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McLean, VA 22101



Field Notes

***Pseudemys concinna concinna* (Eastern River Cooter) VA:** Botetourt Co., 0.3 km stretch of James River upstream of the boat launch on Lowe Street in Buchanan, 30 July 2015, Adrienne and Morgan Palmer.

County Record: Three individuals, two juveniles about 10 cm SCL and one adult about 20 cm SCL, were separately observed basking on fallen trees on the cloudy morning of 30 July 2015. All turtles were easily approached, to within 7 m, and photographs were taken. Their identity was confirmed by Stephen Roble of the Virginia Department of Conservation and Recreation and Joe Mitchell (pers. comm.).

A river guide in town mentioned that turtles have been observed previously on the tubing and kayak trips down this stretch of river. Therefore, it is believed this species is likely indigenous to this portion of the James River. Mitchell and Reay (1999. Atlas of Amphibians and Reptiles in Virginia. Special Publication Number 1, Virginia Department of Game and Inland Fisheries. Richmond, VA 122pp.) and the Virginia Department of Game and Inland Fisheries distribution map show this species occurring in nearby Rockbridge and Montgomery Counties, but not Botetourt. This report extends the range of the Eastern River Cooter into Botetourt County. A Digital Photograph was submitted to the VHS Archive (#376) as a voucher.

Adrienne and Morgan Palmer

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Newmarket, NH 03857



***Hemidactylium scutatum* (Four-Toed Salamander)** VA: Wise Co., The University of Virginia's College at Wise Campus (36°58'37"N 82°33'28.0"W). 20 October 2015. Koen Elswick and David Berry.

County Record: Four-Toed Salamanders are rarely-seen plethodontids that prefer wetlands in or near closed-canopy forest habitat, particularly those with abundant moss cover (*Sphagnum* spp.) as nest sites. In Virginia, however, few records exist for the western portion of the state, and natural history descriptions of this species typically exclude the Appalachian Plateau ecoregion as part of this species' range. In October of 2015, we were conducting a vertebrate inventory behind the UVa-Wise campus and located two Four-Toed Salamanders while flipping ground cover (rocks approximately 20cm x 30cm) in two survey plots approximately 40m above two adjacent retention ponds built during surface mine reclamation. Both salamanders were located in patches of immature forest on this reclaimed surface mine, with Tulip Poplar (*Liriodendron tulipifera*) as the most abundant hardwood on-site. Other vegetation present at both sites includes introduced Multiflora Rose (*Rosa multiflora*) and Autumn Olive (*Elaeagnus umbellata*), both planted during mine reclamation activities.

Some confusion exists as to the status of *H. scutatum* in far southwest Virginia, particularly in Wise County. The VHS database reports an occurrence of the species in the county, although it is likely this refers to records within the Jefferson National Forest originally reported by Roble and Hobson (1995. Records of amphibians and reptiles from the Clinch Ranger District, Jefferson National Forest. *Catesbeiana* 15(1):3-14) that were within 1 km of (but outside) the Wise County boundary in adjacent Scott County. *H. scutatum* is listed as "likely" but not confirmed for Wise County in the Virginia Fish and Wildlife Information Service, with no vouchers formally on record with the Virginia Department of Game and Inland Fisheries (J.D. Kleopfer, personal communication). A recent county record for *H. scutatum* in southwest Virginia also listed the species as known from only neighboring Lee and Scott counties (Powers 2013. *Hemidactylium scutatum* (Four-Toed Salamander) County Record. *Catesbeiana* 33(2):69).

Our record confirms with certainty the presence of *H. scutatum* in Wise County and further extends the range of the species into the Appalachian Plateau province in Virginia, as previous records have been located in or on the border of the nearby Valley and Ridge. The presence of this species at multiple sites on an abandoned surface mine also confirms predictions made by Hobson (1998. *Hemidactylium scutatum* (Four-Toed Salamander) County Record. *Catesbeiana*. 18(2):47-48.) regarding this species' likely more widespread occurrence on mined areas of this portion of the state. Digital vouchers were accessioned in the UVa-Wise Herpetological Collection (UVWHC 2015-01 and UVWHC 2015-02) and were shared with VDGIF officials for inclusion in the VaFWIS database.

Koen Elswick, David Berry, and Walter H. Smith

The University of Virginia's College at Wise
Department of Natural Sciences
Wise, VA 24293



***Chrysemys picta picta* (Eastern Painted Turtle) VA:** Alleghany County, private pond at 3209 Kanawha Trail, Covington, VA. 18 April 2016. Courtney Fridley.

County Record: On 18 April 2016 Courtney Fridley observed a small Eastern Painted Turtle basking on a patch of algae near the shore in her family's private pond. The turtle dove under the water when approached to disappear. On 20 April 2016 Courtney observed likely the same small turtle basking in the pond. Upon taking a quick photo the turtle darted under the water into the muddy bottom. Later, while family members were dipping algae and leaves out of the pond, the little turtle was found to have been scooped out onto shore and more photos were taken before placing the turtle safely back into the water. There are spotty records for this species in western Virginia with single records in the surrounding counties of Bath, Botetourt and Rockbridge. This is a new county record for the Eastern Painted Turtle for Alleghany County (Mitchell and Reay 1999. Atlas of Amphibians and Reptiles in Virginia. Special Publication Number 1, Virginia Department of Game and Inland Fisheries. Richmond, VA 122pp.). Digital photos were submitted as a voucher (VHS Archive # 376).

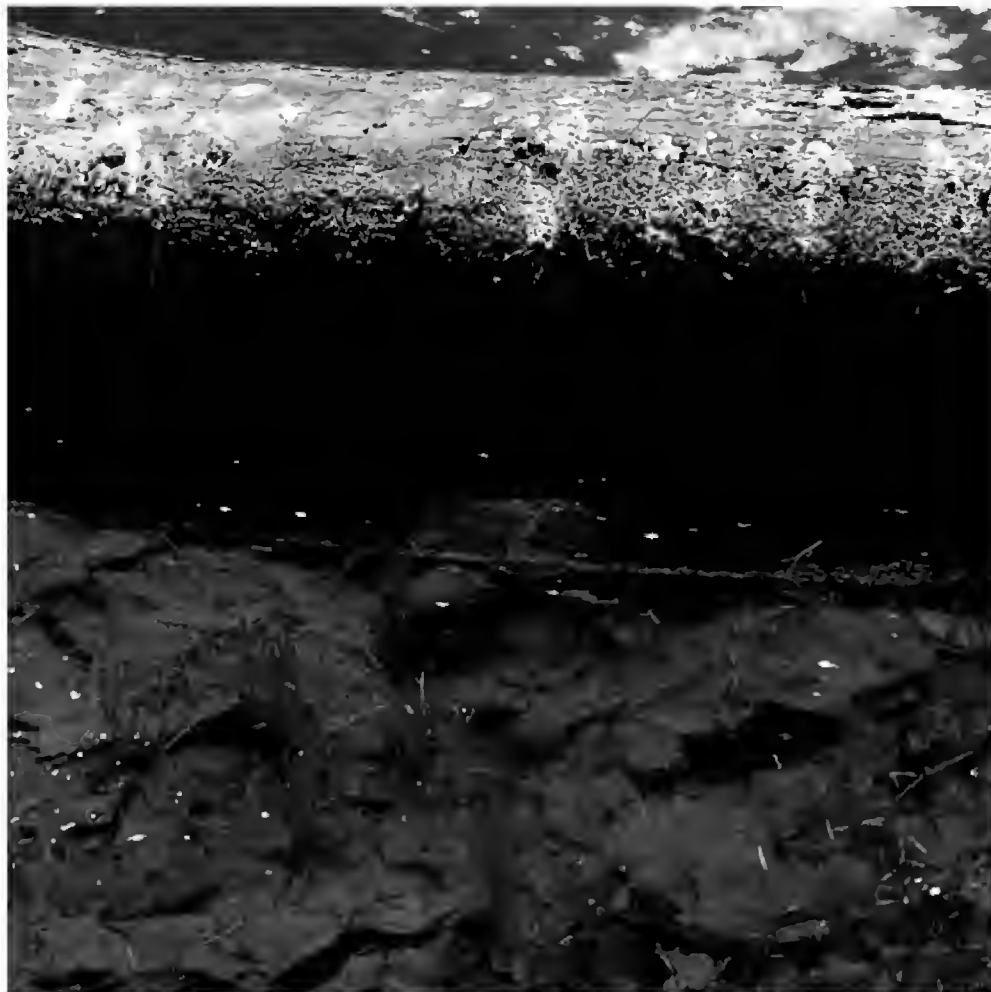
Courtney Fridley
2613 Dogwood Ave
Covington, VA 24426



***Chelydra serpentina* (Snapping Turtle)** VA, Alleghany County Private pond at 3209 Kanawha Trail, Covington, VA 24426, 18 April 2016, Courtney Fridley

County Record: On 18 April 2016 I observed a large snapping turtle sitting at the bottom of a pond on our family's property. The turtle was largely visible with only its tail under the shadow of a large log and sitting completely still. In comparison to the fallen log, the turtle was estimated to be over 30 cm in length. This is a new county record of the snapping turtle for Alleghany County. There are unvouchered reports from the county (Hoffman, R.L. 1945. Notes on the herpetological fauna of Alleghany County, Virginia. *Herpetologica* 2: 199-205.; 1986. The herpetofauna of Alleghany County, Virginia. Part 3, Class Reptilia. *Catesbeiana* 6:4-9.) from the Jackson and Cowpasture Rivers as well as smaller streams, but no vouchers exist. The photographs submitted (VHS Archive #377) verify the Snapping Turtle's presence in the county.

Courtney Fridley
2613 Dogwood Ave
Covington, VA 24426



President's Corner

Greetings my fellow herp enthusiasts,

We have finally made it through the winter months and can bask peacefully in the warm glow of the springtime sun. Luckily, it is warm enough for our herp friends to bask right alongside us. As our native reptile and amphibian populations become more active, we have many events planned that will put you right in the middle of the action.

The 11th Annual HerpBlitz will be held at Stewarts Creek Wildlife Management Area in Carroll County on Saturday, May 28 and Sunday, May 29. This survey is better suited for more advanced herpers as it requires long hikes with no cell service or bathroom facilities. If you are up for the challenge, expect upland hardwood forests, pine forests and great salamander habitats. Due to parking limitations, the survey is limited to fifteen participants with the Sunday survey being members only.

A special survey is being conducted by Vice President Matt Neff at The Quarry Gardens in Nelson County. This is a private property that will eventually open to the public in April of 2017. This survey will be held on June 4 and is limited to members only. Lunch will be provided and a maximum number of participants has been set at thirty.

The 2016 Annual Spring Meeting and Survey will take place at Natural Bridge in Rockbridge County on the weekend of June 11. This area has a lot of great habitats, and the VHS will be the first herpetological group to officially survey the property. The weekend will consist of a Friday business meeting and survey planning. Saturday will be the main survey with Sunday being a member's only survey.

To find out more information, or to register for upcoming surveys, please visit our website. Space may be limited, so please register quickly. Once we have enough participants for a specific survey, we will close registration.

One of the main goals of the VHS is funding research grants that will advance our knowledge of native herpetofauna. Over the winter, we received some great proposals from students and professors throughout academia. Unfortunately, we could not fund them all, but I would like to highlight some of the research that did get funded.

George Argyros will be conducting research into the phylogeography of montane salamanders in southwest Virginia. This research will also serve to demonstrate the effectiveness of a noninvasive DNA sampling technique. Logan McDonald will be researching the effects of fire disturbance on habitat selection by Cope's gray treefrogs. Dr. David McLeod of James Madison University is developing an outreach program for elementary through high school students. This outreach program will introduce the students to native reptiles and amphibians as well as teach an age-appropriate curriculum.

These three grants were completely funded for a total of \$1,500. In addition to these

grants, the VHS has also decided to fund a project with Dr. Joseph Mitchell. Dr. Mitchell will be developing a searchable bibliography of Virginia herpetofauna. The completed bibliography will be housed on the VHS website, and any future references will be maintained by VHS volunteers. This bibliography will prove to be a valuable resource for anyone conducting herpetofauna research in Virginia.

One last thing I would like to mention is that the Department of Game and Inland Fisheries will be holding a photo contest to determine the cover of their upcoming Snakes and Lizards of Virginia book. This contest will have two winners selected. The first will be a snake photo that will appear on the cover and the second will be a cover page for the lizards section which will appear in the book. There is a cash prize for both winners, and participation is limited to Virginia Herpetological Society members. More information can be found on our website.

I wish everyone a great year of herping and look forward to seeing you out in the field.

Mike Salotti
VHS President



**Virginia Herpetological Society
Annual Business Meeting-VCU Rice Center
Minutes of Fall 2015 Meeting**

Kory Steele, President of the Virginia Herpetological Society (VHS), opened the meeting on October 24, 2015 at approximately 15:30 hr. EDT and provided the agenda for the meeting.

Old Business

VHS Webmaster, John White, indicated that there had been no real progress since the spring survey on creating an open journal system for Catesbeiana. Kory Steele indicated that project would have to be taken up under the next VHS administration and encouraged more assertive efforts toward implementation.

Committee Reports

Newsletter Report

Co-Editor Susan Watson reported on the status of the VHS Newsletter as Co-Editor Joellen Welch was unable to attend the business meeting. The most recent VHS Newsletter appears to have been well received and no complaints have been recorded. It was agreed the target date for publication of the next VHS Newsletter would be November 2015.

Catesbeiana

Paul Sattler, Editor of Catesbeiana, reported that the autumn issue of Catesbeiana had been delayed to await the inclusion of the VHS election results from the meeting today. It will be sent out soon. For the spring issue, there is the potential to include three not yet completed survey reports and an article by Education Committee Chair Mike Clifford on the subject of his presentation today concerning new cottonmouth and timber rattlesnake county records. There should be enough material for the spring issue if these survey reports and articles are completed in a timely manner.

Education

Mike Clifford, Education Committee Chair, provided a written annual report (included herein) of VHS member education activities for the period October 2014 to October 2015.

HerpBlitz

Jason Gibson, VHS HerpBlitz Chair, reported that the 10th annual HerpBlitz survey was successfully conducted at Breaks Interstate Park (BIP) in June. The survey report will include the results of the June survey and the prior survey at BIP several years ago.

Café Press

Patty Crane, Café Press Coordinator, was unable to attend the business meeting and there was no news to report.

Treasurer/Secretary

Dave Perry, VHS Treasurer/Secretary, reported that VHS cash on hand at the start of the business meeting totaled \$13,331.39. However a check for \$149.90 issued to Patty Crane for VHS calendar expense re-imburement had not yet cleared the VHS bank account. Cash net of that liability totaled \$13,181.49. However with the \$500 donation awards today provided to Virginia

Reptile Rescue and the VCU Rice Center, the VHS cash balance is projected to decline by a corresponding amount.

Research

Mike Meyer, VHS Research Chairperson for 2013-2015 has decided to step down due to a very busy schedule. Kory Steele has been appointed to succeed Mike and will also undertake VHS grants proposal writing supervision and approved grants follow-up responsibility.

Conservation

Dave Perry, Conservation Committee Chair, indicated that the committee focus would continue to be on field survey projects for species with VDGIF tier I to tier IV status. For 2016 the Conservation Committee was considering a survey of Chickahominy WMA with the Glossy Crayfish Snake as a possible target species. The last Virginia documentation for this species was in nearby New Kent County. Susan Watson indicated there may be other species present in CWMA with tier I to tier IV status, such as the Diamond Back Terrapin, and will provide a list of other potential target species.

Advisory Committee

There were no updates to report.

New Business

Donations from VHS

Kory opened the discussion by indicating that VHS should be ready to make more donations to worthy organizations which have either assisted VHS or contributed to herpetology in Virginia. Donations made today to Virginia Reptile Rescue and the VCU Rice Center were sighted as examples. Paul Sattler recommended a \$500 donation to FrancisEmma, Inc. of Bell Meade Plantation, Powhatan for past survey cooperation. This recommendation was seconded by Jason Gibson and approved by Kory. The Treasurer will mail a \$500 donation check after Jason is able to identify the official name of the recipient charity. Kory also indicated that the VHS should consider a future donation to Three Lakes Nature Center.

James Organ journals donated to VHS

James Organ has bequeathed his collection of herpetological and ecological journals to the VHS. It is a sizable collection (13 shelves of about 3 meters length). Sylvia Organ, a daughter of James, has indicated that the VHS is free to retain, sell, auction or donate any and all of the journals. Dave Perry will provide the first rough listing of the applicable journals (and a picture) to the Executive Committee. It was decided that the VHS will take possession and evaluate all of the journals and then make a disposition determination. Matt Close volunteered to pick up the collection in Troutdale, VA from Sylvia Organ at a mutually convenient date and time.

Survey Committee

Kory Steele, Jason Gibson and others have been discussing ways to improve the VHS organization, with an objective of increasing the opportunity for member participation at the officer and committee chair level. Field data analysis and survey report writing can be difficult for first time candidates for President and Vice President and some of the other positions and may limit participation. There is a need for a new position of Survey Committee Chair to help maximize field data collection and facilitate survey report writing. Some of the responsibilities

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of the position would be to develop data collection and report content templates, data sheets for the VHS archives and survey site history or potential (i.e. where have surveys been or not been completed). Jason Gibson was appointed Survey Committee Chair. The HerpBlitz survey will be folded into this new committee and the HerpBlitz Chair will be eliminated.

Advisory Committee Chair

To further the objective of increasing the opportunity for member participation at the officer and committee level and to provide options for future succession planning, there is a need to increase the role of the Advisory Committee through the establishment of an Advisory Committee Chair (ACC). Historically, the Vice Presidents have typically succeeded the preceding President. However, there is no obligation to do so. The VHS needs to develop alternative succession candidates for these positions. The ACC will be a second resource to the President, equally involved as the Vice President in all communication and planning activities in support of the President and VHS. The ACC will also provide leadership and communication for the Advisory Committee. John Orr is appointed Advisory Committee Chair. Jason Gibson suggested that Mark Khosravi be appointed to the Advisory Committee to fill the position vacated by John.

Café Press Chair

For personal reasons, Patti Crane has resigned as Café Press Chair. Some concern was expressed that the monetary and public relations potential of Café Press is not being fully realized. There may be opportunities to improve monetary and public relations potential with new leadership. The search is on for a new Café Press Chair with Kelly Geer and Bonnie Keller suggested as possible candidates.

Potential Survey Sites for 2016

There was discussion about possible sites for the spring survey and the HerpBlitz. Personnel at Natural Bridge have strongly encouraged VHS to hold the spring survey there. Jason Gibson is leaning toward Carroll County for the HerpBlitz. Carroll County has several areas that could support a survey. No final decisions were made. In addition, the VHS has been invited to conduct surveys at Joseph Pines Preserve and Center for Biodiversity (Sussex County, 232+ acres) and The Quarry (soapstone) Gardens at Schuyler (Nelson County-several hundred acres). These sites might be more suitable for smaller or local VHS survey groups. With all of the potential survey sites, dates will need to be established early to avoid schedule conflicts.

Open for new business

There were no additional new business topics.

Officer Elections

The following VHS officer candidates are affirmed and will serve officer positions for the two year period October 2015 to October 2017: President-Mike Salotti, Vice President-Matt Neff, Treasurer-Matt Close, Secretary-Dave Perry.

The meeting was adjourned by Kory Steele at approximately 16:30 hr.

David A. Perry
VHS Secretary

**Virginia Herpetological Society
Treasurer's Report
May 2016**

A Treasurer's Report was not available at publication/posting time. A Report will be available at the annual Spring Meeting at Natural Bridge on 10 June 2016.



Field Notes

The field notes section of *Catesbeiana* provides a means for publishing natural history information on Virginia's amphibians and reptiles that does not lend itself to full-length articles. Observations on geographic distribution, ecology, reproduction, phenology, behavior, and other topics are welcomed. Field Notes will usually concern a single species. The format of the reports is: scientific name (followed by common name in parentheses), state abbreviation (VA), county and location, date(s) of observation, observer(s), data and observations. The name(s) and address(es) of the author(s) should appear one line below the report. Consult the editor if your information does not readily fit this format. All field notes must include a brief statement explaining the significance of the record (e.g., new county record) or observation (e.g., unusual or rarely observed behavior, extremely early or late seasonal record, abnormal coloration, etc.). Submissions that fail to include this information are subject to rejection. Relevant literature should be cited in the body of the text (see Field Notes in this issue for proper format). All submissions will be reviewed by the editor (and one other person if deemed necessary) and revised as needed pending consultation with the author(s).

If the field note contains information on a new county (or state) record, verification is required in the form of a voucher specimen deposited in a permanent museum (e.g., Virginia Museum of Natural History) or a photograph (print, slide, or digital image) or recording (digital recording of anuran calls) deposited in the archives of the Virginia Herpetological Society. Photographs and recordings should be sent to the editor for verification and archiving purposes; the identity of voucher specimens must be confirmed by a museum curator or other qualified person. Include the specimen number if it has been catalogued. Prospective authors of distribution reports should consult the VHS website (County/City Herp Lists) to determine if they may have a new county record. New distribution records from large cities that formerly constituted counties (Chesapeake, Hampton, Newport News, Suffolk, and Virginia Beach) are acceptable, but records from smaller cities located within the boundaries of an adjoining county will only be published if the species has not been recorded from that county. Species identification for observational records (e.g., behavior) should be verified by a second person whenever possible.

PHOTOGRAPHS

High contrast photographs (digital images) of amphibians and reptiles will be considered for publication if they are of good quality and are relevant to an accompanying article or field note. Published photographs will be deposited in the Virginia Herpetological Society archives.

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